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VOL. 42 SEPTEMBER, 1952 NO. 9

NEXT ISSUE

An article on accelerated weathering is scheduled for the October issue. The author traces the development of accelerated weathering with particular emphasis on studies made by the ASTM. Various mechanical weathering devices are discussed together with the presentation of various opinions on results obtained with such testing equipment.

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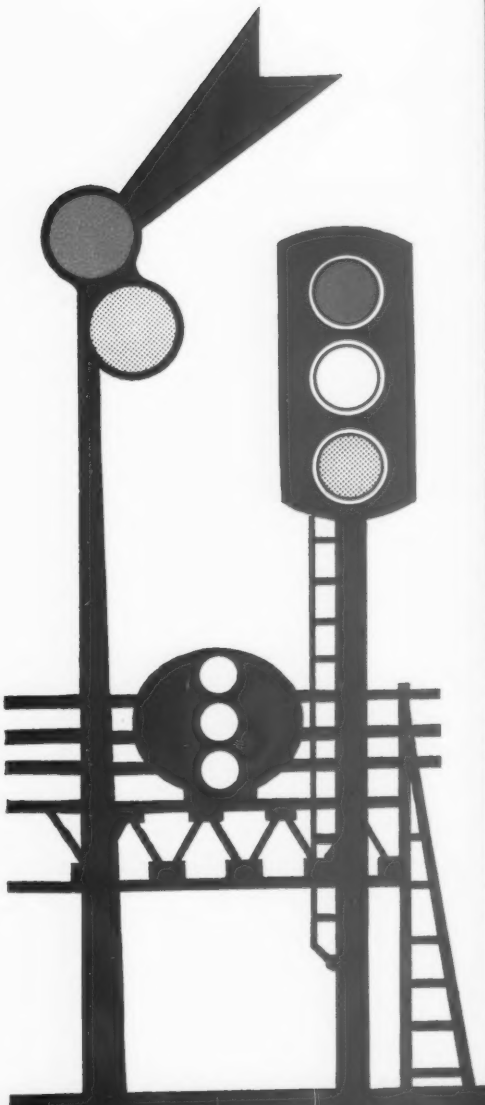
safer colors for latex paints



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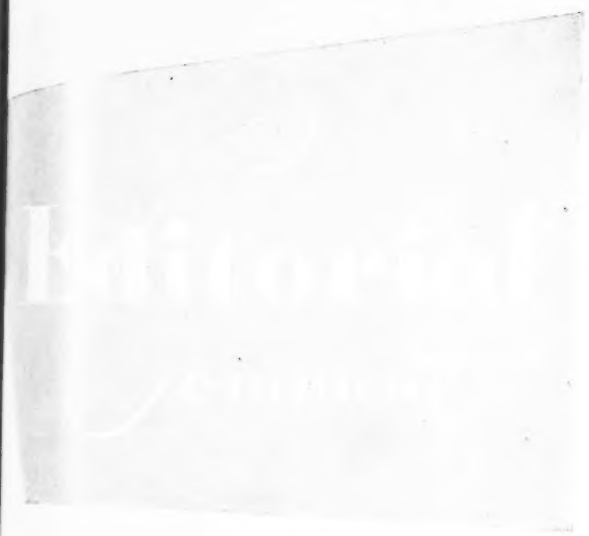

Drying Paint with Vapors

IT WAS recently reported that sulfur dichloride vapors have been quite effective in aiding the drying process of coatings of ink, paint, or varnish. This method is said to be adaptable to such operations as oilcloth and linoleum manufacture, furniture and appliance finishing, and many types of printing processes. The operation consists of passing the coated material through a chamber where sulfur dichloride vapors react with the coating and harden it within a few seconds. The reaction is said to produce a hard film or deposit in 10 seconds or less in the case of unsaturated oils, and in 30 seconds with saturated ones. A draw back with this process is the necessity of a cleaning operation following contact with the vapor since sulfur dichloride can have a deleterious effect on the material being coated or printed.

Profits from Complaints

NO matter what business you are in today complaints are inevitable and unavoidable, and it behooves the seller to develop the right approach in the handling of customer complaints.

The key to the right approach which will bring satisfaction to your customer is based on the following rules (from ACS meeting, symposium on complaints, Sept. 6, 1950):

1. Answer complaints promptly
2. Investigate thoroughly
3. Listen carefully to the originator of the complaint
4. Be diplomatic
5. Profit from the complaint

Solving a problem arising from a complaint is not an easy task. Oftentimes, the core of the trouble lies in the customer's plant. In the case of users of protective and decorative finishes, application methods must be studied thoroughly. This involves a complete analysis of the surface preparation operations to the final application of the finish. It means watching every step closely.

This type of technical service requires utmost skill and diplomacy. It also affords the salesman an opportunity to get to know his customer processes better and, thus provide him with a wider scope for selling other products.

Undoubtedly many complaints are the result of improper handling or lack of technological "know-how" in the use of a product.

These, given prompt attention, can be solved immediately, and in many instances would not have occurred if proper instructions or literature were furnished to the user.

However, there are instances where thorough investigation does not yield an answer to a problem. In such cases it may be necessary for the manufacturer to produce an entirely new material to do the job. This may give rise to new uses of the product, which may be successful in other industries.

A Challenging Opportunity

THE National Paint, Varnish and Lacquer Association recently received a communication from S. K. Coburn of the Engineering Division of the Association of American Railroads requesting a special type of fire retardant paint applicable to wood railroad ties and useful for exterior exposure in all parts of the country.

This coating material should be capable of withstanding the action of sunlight, rain, windblown dust abrasion and the high and low temperature extremes recorded in the United States. This paint should be able to resist temperature rises to approximately 1900 deg. F. within a 25-second interval and maintained for three to five minutes. The coating shall be capable of insulating timber surfaces so that interior temperature rises during the foregoing conditions shall be held to a minimum.

In some parts of our country weeds are blown against piles of railroad ties and tests have indicated that the temperature from flash fires of such tumble-weeds reaches as high as 1400 deg. F. The presence of a wood preservative on the ties and piles adds to the difficulty of solving the problem, but obviously the coating should possess good binding properties.

There is no doubt that the requirements demanded by the Association of American Railroads are stringent, and it may be very possible that no coating can be formulated to meet all of the above properties. However, it is apparent that specialized finishes are being demanded more and more for maintenance purposes. Thus, the paint chemist's job becomes an important one, for upon his shoulders falls the responsibility of formulating a specialized product which could develop into a real money maker.

Does this city mean business for you?

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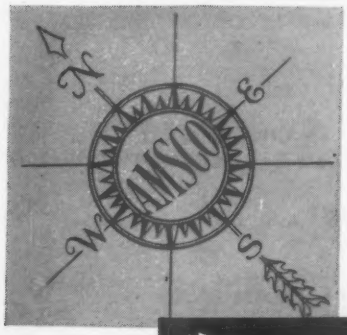

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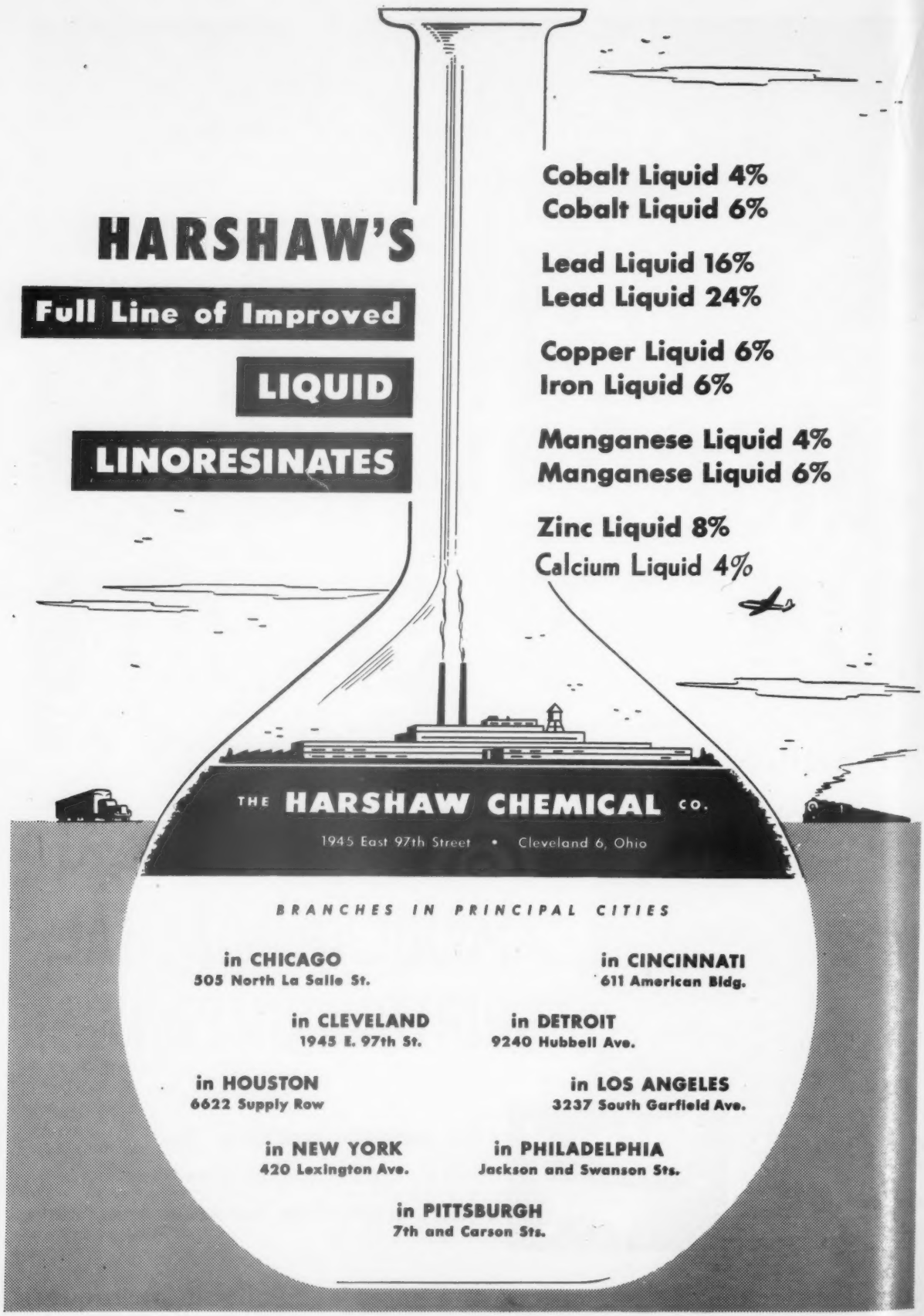
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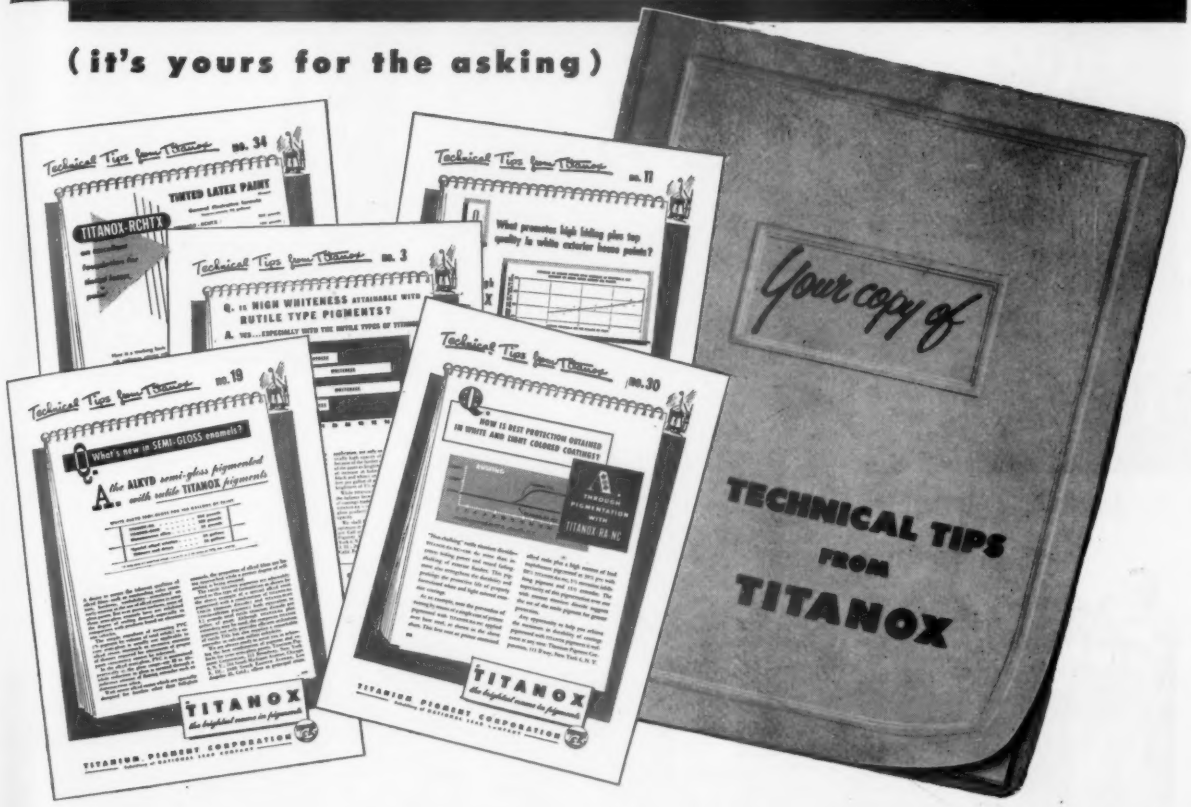
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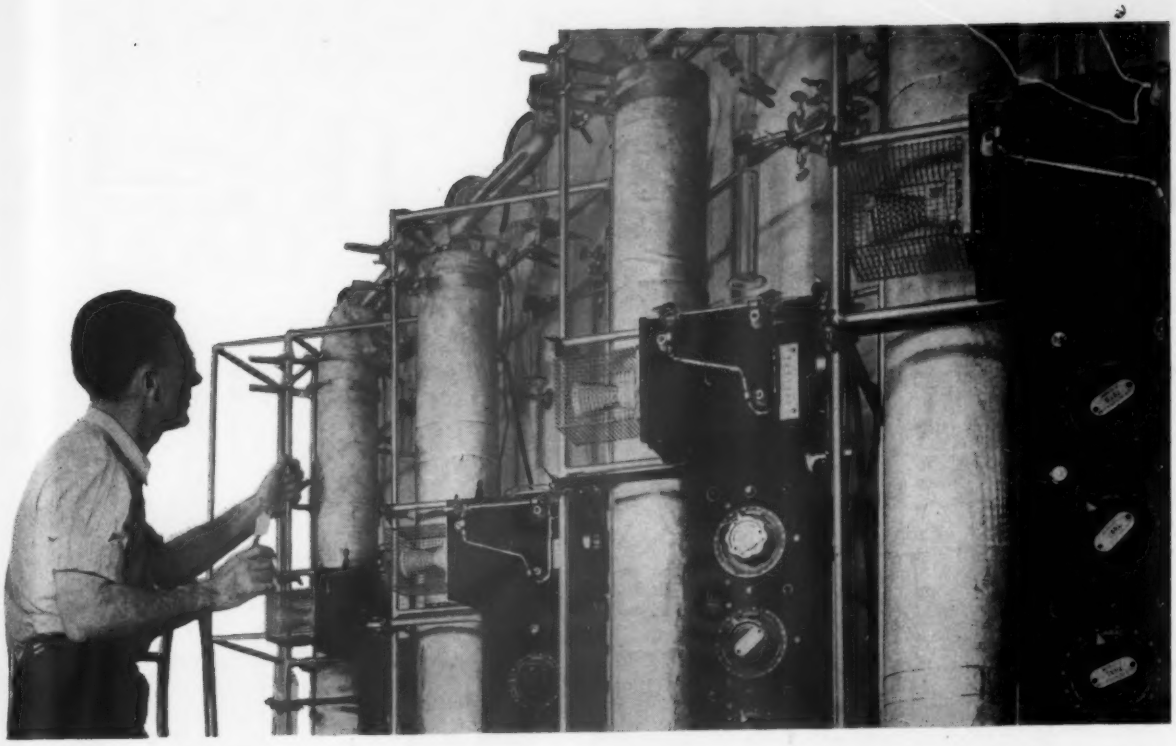
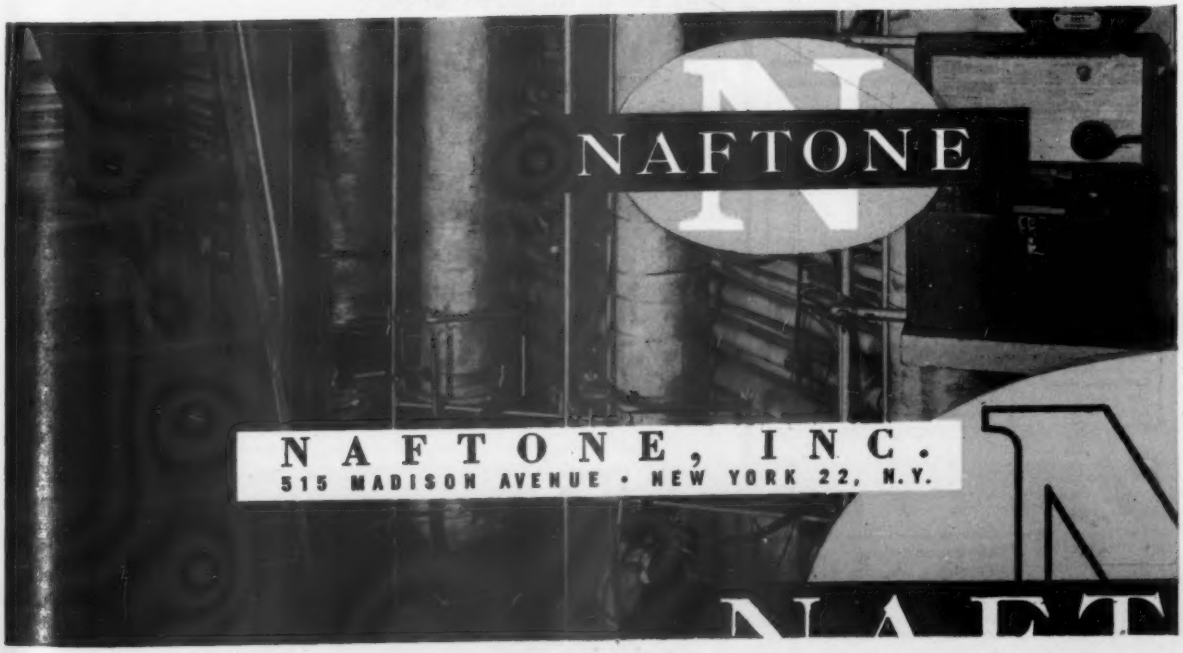


these four columns are precision distillation equipment typifying research and development work on

ORONITE NAPHTHENATE DRIERS



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VEHICLE PROPERTIES:		
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Solids	50%	50%
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Color (Gardner)	12-13	12-13
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Tack Free	2 Hours	6 Hours
Print Free	3 Hours	8 Hours
Dry Hard	5 Hours	18 Hours
Kauri Reduction	Passes 170% Fails 180%	Passes 80% Fails 90%
GAS PROOF TEST	Passes	Passes
WEATHEROMETER TEST	247 Hours	228 Hours
RESISTANCE TESTS:		
H_2O @ 77° F.	72 Hours—Film O.K.	72 Hours—Film O.K.
H_2O @ 212° F.	6 Hours—Film O.K.	5 Hours—Film O.K.

Prominent among the applications of Velsicol AD-21 is its use as an extender for 100% oil soluble phenolic resins. This type of application is capable of providing considerable saving in raw material costs, with resulting retention of desirable performance properties.

Data at the left represents two typical applications in which Velsicol AD-21 can be used as partial replacement of 100% oil soluble phenolic resins.

For additional data and information, request Velsicol Technical Bulletin No. 219.

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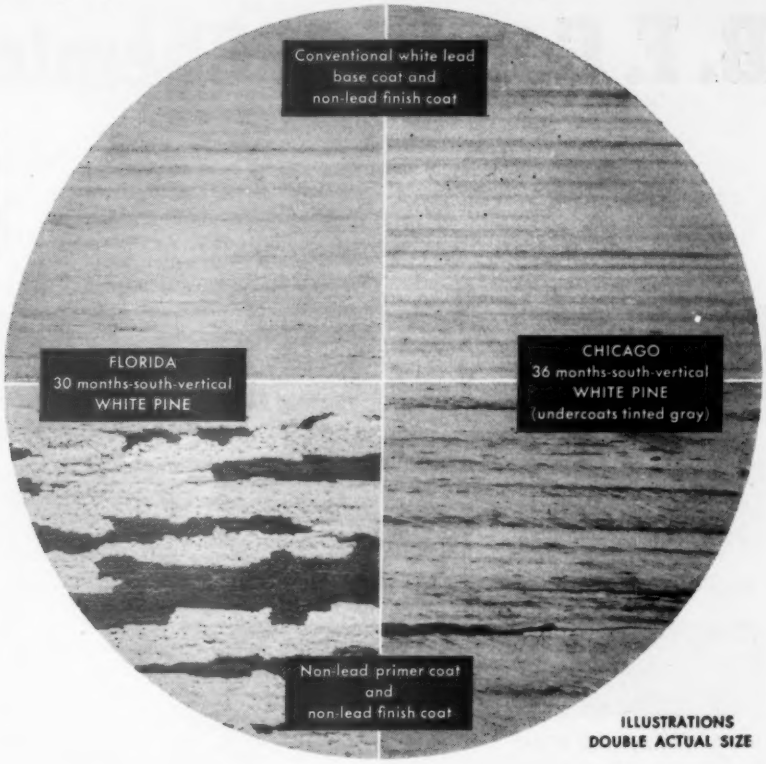
TWO SEVERE TESTS



ILLUSTRATIONS DOUBLE ACTUAL SIZE

Here's picture-proof of how "leaded" primer coats have greater staying power. The comparison of the white lead mixed pigment primer applied under a lead-free finish coat; and the lead-free paint, self-primed, emphasizes the superior performance of the "lead" primer. (Primers in Chicago exposure were tinted gray to highlight any topcoat erosion).

White lead's ability to stabilize and plasticize the film, to strengthen paint and to help it retain the optimum amount of oil explains why white lead primers withstand severe climatic conditions.

Chicago's industrial gases and rapid temperature changes, as well as Florida's moisture and sun-bake treatment, failed to permeate or crack the protective film of the white lead mixed-pigment primer—even though the non-lead finish coat showed rapid chalking and erosion that a conventional "lead" finish would have prevented. *Conclusive* proof of the tough, protective film that white lead gives to base coats.

That's why paint manufacturers offer their lead-pigmented paints with the assurance of longer staying power. For detailed information on the most effective use of "lead" in your paints — write for "White Lead in Mixed Pigment House Paints" and "White Lead Technical Bulletin #1." *Lead Industries Association, 420 Lexington Ave., New York 17.*

"LEAD" LENGTHENS THE LIFE OF PAINT BECAUSE:

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It Strengthens . . . flexible, spiny, lead-soap particles mechanically reinforce the film and increase elastic strength.

It Resists Water . . . paint films with an optimum, lead-pigment content absorb only a small fraction as much water as do lead-free paints.

It Limits Oil Penetration . . . more of the vehicle remains in the film where it is needed; less is absorbed in the substrate.

It Improves Appearance . . . by controlling chalking and inhibiting mildew.

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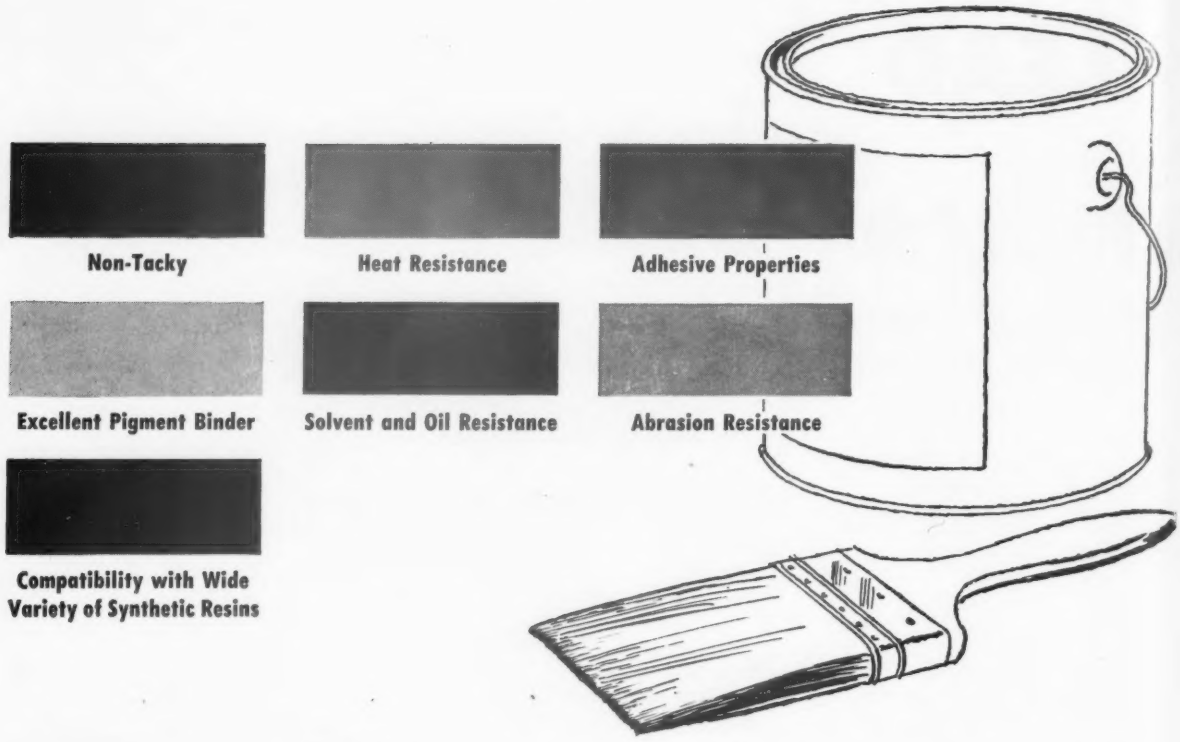

Seven Ideas for paint formulations - with HYCAR latex!

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  - Naphthenic Acid Driers
    - Lead-Cobalt-Calcium
    - Manganese-Zinc-Iron
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    - Lead-Cobalt-Manganese
  - Witall (Tall Oil) Driers
    - Lead-Cobalt-Manganese
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- Lead Linoleate
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- Metallic Stearates
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Solvent	Mineral Spirits	Mineral Spirits
Viscosity, Gardner-Holdt Scale	T—U	U—V
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Type of oil	Soyabean	Soyabean

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A Pigment Particle Surface

By E. J. DUNN
National Lead Company
Research Laboratories

SURFACE chemistry is one of the more important factors in the paint industry. For years, we have noted in the literature articles on wetting, dispersion, flocculation, surface treated pigments, aids to grinding, hydrophillic and hydrophobic agents and polar and non-polar vehicles. Most of this surface chemistry has been in conjunction with the alteration of vehicles to beneficially affect the interfacial contacts of vehicle and pigment. The work of this paper is the collection of data to resolve a specific pigment particle surface. Surfaces of pigment particles are complex and attempts to resolve their structure present a real problem.

The pigment chosen to make a study of the surface of the particles is basic silicate white lead "45X". The principle by which this particle is fabricated is on the basis of an inert silica core with an active pigment layer coating the inactive silica core.[1]

Many years ago, microscopical examinations were made of the pigment particles in paint films aged up to five years on our exposure fences at Sayville, L. I.

This study showed that the pigment particles in the aged film were of the same general particle size and same general particle shape as when they were initially incorporated in the vehicle. It was evident from these studies that only a relatively small amount of the total reactive pigment is used for the chemical reactions required to stabilize the film during its life. Therefore, if a reactive pigment is fabricated as a surface coating at the outer layer of the particle, it will be most efficiently used for its film building properties.

Basic silicate white lead "45X" is made from ground silica. The ground silica is added to a slurry of litharge treated with H_2SO_4 to form hydrous tribasic lead sulfate. This combined mixture is furnaced so that the interaction of the tribasic lead sulfate with the surface of the silica particles form monobasic lead silicate and monobasic lead sulfate by dry phase reaction.

Basic lead silicate white lead "45X" has a chemical analysis, for example, lead expressed as Pbo 47.9%, SiO_2 47.9% and SO_3 4.2%. This may be calculated to be the equivalent of approximately 28% monobasic lead silicate, 28% monobasic lead sulfate and the remainder silica. It is estimated, by calculation, that the coating of lead compounds on the silica core approximates 0.1 micron in thickness when the silica particles have an average diameter by surface mean of 3 microns.

Eight different techniques were used to try to develop information demonstrating the presence and physical form of the sulfate stabilized lead silicate coating on the silica core. These procedures were transmitted light microscopy, X-ray studies, chemical reactivity studies, electron microscopy, elec-

tron diffraction, settling tests with known specific gravity liquids, phase microscopy and pigment extractions.

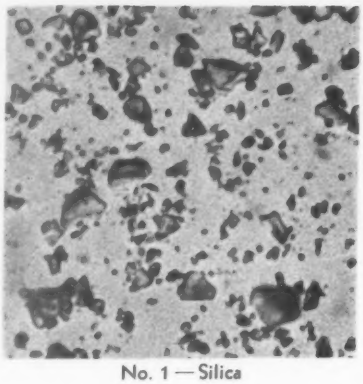
Microscopy

ONE of the more promising of these procedures appears to be transmitted light microscopy. We have a series of photomicrographs showing silica particles, basic lead silicate white lead "45X" particles and blends of these two materials treated with potassium sulfide solution. Photomicrograph #1, Figure 1, shows a typical picture of silica particles taken at 1,000 diameters. It is evident that an array of various particle sizes are present. Particles are angular and irregular, very transparent and show various conchoidal fractures due to grinding.

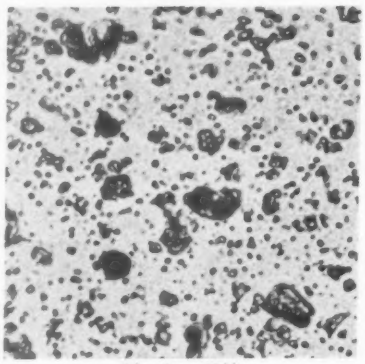
Photomicrograph #2, Figure 1, is a typical photomicrograph of basic silicate white lead "45X" particles. These particles have the silica core with the sulfate stabilized coating of lead silicate. Here the particles look somewhat similar in particle size to the previous photomicrograph of silica particles. However, the particles are all rough surfaced, and the angularity of the silica particles has diminished; demonstrating the surfaces of the particles have been affected. The transparency noted in the silica particles is replaced by the translucent or opaque particles in the 45X. A rough approximation of the average diameter by surface mean for this material would be 3 microns with the bulk of the particles in the range of 1 to 4 microns.

If these 45X particles are treated with a potassium sulfide solution, the presence of lead will be shown by the darkening due to lead sulfide formation. Photomicrograph #3, Figure 1, shows the lead sulfide formation. The black discoloration is completely covering the surfaces of practically all the particles in the field. In other words, the lead silicate and lead sulfate is formed all over the surfaces of the silica particles.

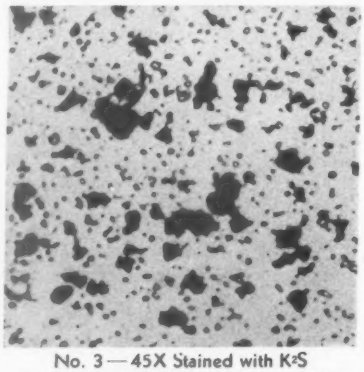
Similarly, if we take a mixture of free silica and basic lead silicate white lead "45X" particles and treat them with K_2S, the free silica particles are apparent as very clear transparent angular particles,



No. 1 — Silica



No. 2 — 45X



No. 3 — 45X Stained with K_2S

Figure 1. Photomicrographs — 1000X

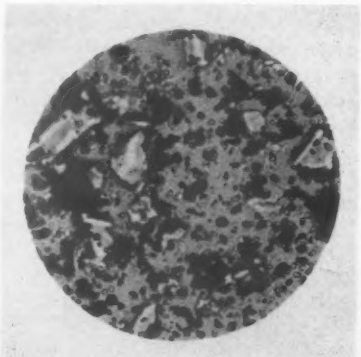


Figure 2. Photomicrograph of Silica and 45X Mixture (50-50) stained with K_2S—Number 4

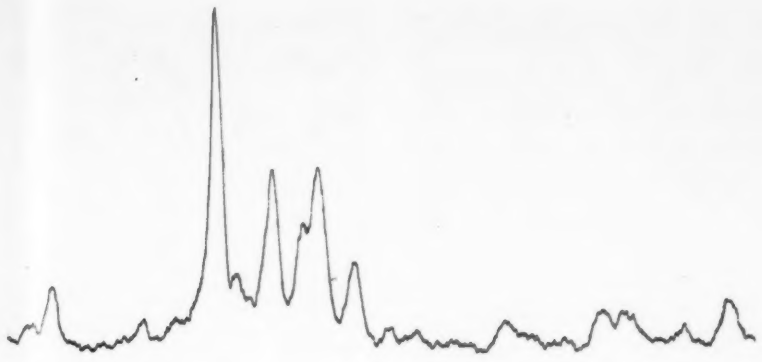
whereas the basic lead silicate particles are blackened, rough surfaced and more rounded. The photomicrograph of Figure 2 illustrates this effect. This series of photomicrographs is a strong demonstration that the solid phase reaction between silica and tribasic lead sulfate produces a coating of lead compounds on the surface of the silica particles. This procedure of identifying 45X particles has been forwarded to the National Bureau of Standards for their use in the verification of the coated particle.

X-Ray

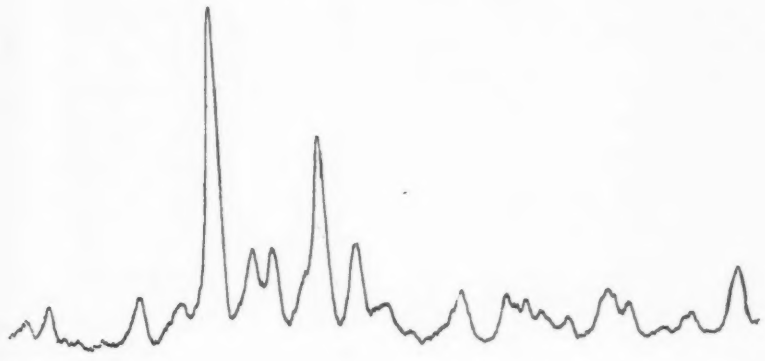
X-RAY studies were conducted to help analyze the composition of the 45X particles. X-Ray analyses show that 45X particles consist of three compounds, namely silica — SiO_2, monobasic lead silicate — $PbSiO_3 \cdot PbO$ and monobasic lead sulfate — $PbSO_4 \cdot PbO$. Mechanical mixtures were prepared according to the stochiometric chemical combinations of these products, and X-ray patterns taken and correlated with X-ray patterns of the fabricated 45X particles. An examination of the spectrometer patterns in Figure 3 shows there are no lines evident in the mechanical mix that do not typify lines of these three compounds. However, it is evident from these patterns that two lines of the monobasic lead silicate are more evident in the mechanical mix than in the 45X product. It is practically impossible to make a mechanical mix of the same fine particle size and orientation as the fabricated product so this intensity difference may be expected.

If this X-ray data is used to plot the interplanar spacings for the various lead silicates[2] that are known, a diagram is obtained such as Figure 4. A comparison of this data with the X-ray data of the basic lead silicate "45X" shows that the silicate produced on calcination is monobasic lead silicate, $PbSiO_3 \cdot PbO$.

Similarly, a plot of the interplanar spacings of the various lead sulfates that we have made is given in Figure 4. When this data is compared to the pattern of basic silicate white lead "45X", it is evident that the lead sulfate produced during calcination is monobasic lead sulfate, $PbSO_4 \cdot PbO$.



Basic Silicate White Lead 45X



Mechanical Mix of Basic Silicate White Lead Components

Figure 3. X-Ray Spectrometer Patterns

Fortunately, there isn't any confusion of the lines of the monobasic lead sulfate with the monobasic lead silicate, and these compounds are readily detected in the 45X.

Some further X-ray work on especially fabricated large single crystals or particles of 45X was conducted. A micro X-ray camera was used for this work. A single particle was mounted on a glass rod, as shown in Figure 5. This particle was placed in a diaphragmed X-ray beam and patterns were taken through the middle of the particle. It may be of interest to mention that exposures under these conditions required about thirty hours to obtain a pattern. The patterns obtained consisted of a series of rings and a series of speckled dots, as illustrated in Figure 6. There are about a dozen rings in this pattern. By calculation, it was shown that the rings gave lines that were typical of some of the lines of monobasic lead sulfate and monobasic lead silicate. Then the coating on this particle was carefully extracted chemically and another set of X-ray pictures taken. In the second series, only the speckled dots were obtained. By calculation, the dots were identified as some of the lines for silica. Not all the lines of SiO_2 showed up in the micro X-ray pattern, but similar treatment of 45X and a pattern on the X-Ray Spectrometer showed all the lines for silica. It is evident from this series of micro X-ray patterns that this technique is a valuable tool to demonstrate the presence of the coating as it can be worked with a single particle. This micro X-ray work was conducted at *Brooklyn Polytechnic Institute* by *Mrs. M. Bergmann.*

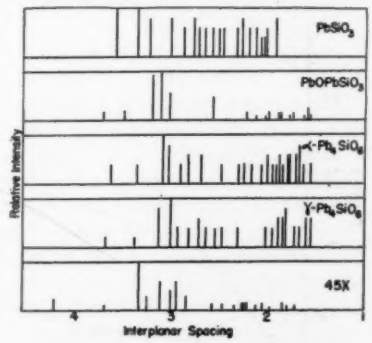
Chemical Reactivity

A THIRD means of studying the surfaces of these particles was through a measure of the chemical reactivity of these particles as they aged in paint films on our exposure fences.[3] A study was designed to measure the soap formation developed in linseed oil paint films of basic lead sulfate pigment, basic lead silicate white lead pigment 45X and to compare these reactivities with basic lead carbonate, a standardized pigment in the trade. Results of these tests over a three year period are shown in Figure 7.

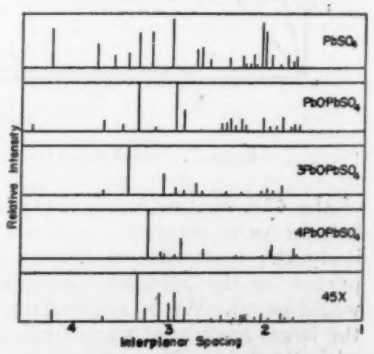
It is evident from this graph that monobasic lead sulfate has had a small amount of reactivity during the life of such a paint film. The basic lead carbonate has considerably more reactivity than the basic lead sulfate. In the case of basic silicate white lead, the reactivity is greater than for basic lead carbonate. Basic lead carbonate is considered a standard reactive pigment of the trade, but in this series, it has not equalled the reactivity of the basic lead silicate white lead. The 45X pigment particles are coarser than the basic carbonate white lead particles but still the reactivity of the 45X is greater. These values should be thought of as trends of these reactions as conditions in films vary, and, therefore, results vary but the trends stay the same.

It is evident from the graph that that monobasic lead sulfate portion

Figure 4. Intensity — Interplanar Distance X-Ray Plots. Data for plots are given in Table I



Lead Silicates and 45X



Lead Sulfates and 45X

Fig. 5. Particle of 45X mounted on glass rod

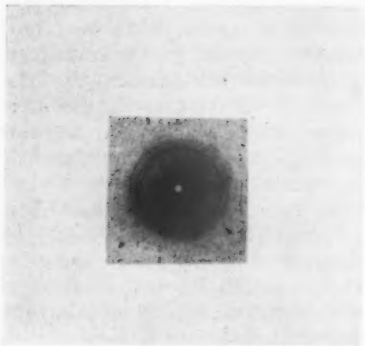


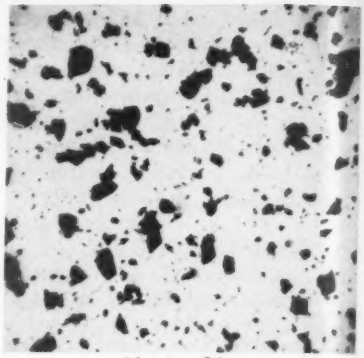
Fig. 6. Micro X-ray pattern taken through 45X

particle is due to the increased chemical reactivity of the monobasic lead silicate but to the unusually fine particle size of the particles in the surface coating. This is further indication that the lead compounds have to be at the surface of these particles as a thin coating to be so chemically active as there is 47.9% SiO_2 in this 45X pigment.

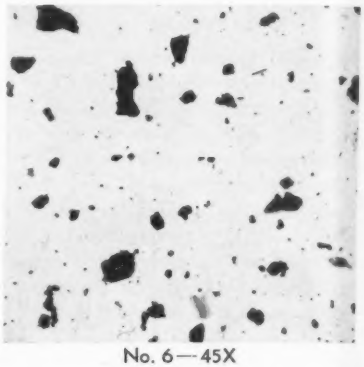
Electron Microscopy

ELECTRONMICROGRAPHS were prepared to determine if electron microscopy would resolve the lead silicate coatings on the silica particles. A direct comparison of the electronmicrographs of the straight silica and the basic silicate 45X showed no characteristic differences in contrast that could be attributed to the lead silicate coating, as may be noted in Figure 8. Both types of particles tend to be opaque to electrons, probably due to their thickness, and practically no pronounced difference in contrast could be developed between the silica and 45X.

In view of this, an attempt was made to establish a special technique of mounting whereby the coating of lead compounds could be dissolved away from the silica particles. If the coating could be dissolved away, it might show the effects of the surface layer. Some success was obtained in dissolving the lead coating with a solution of ammonium acetate leaving the effect of a hole in the mount. However, this procedure did not appear to give the transparency required to show the proper contrast between the silica and the 45X particles. These electronmicrographs were taken initially at 18,800 diameters.



No. 5—Silica



No. 6—45X

Fig. 8. Electronmicrographs of silica and 45X

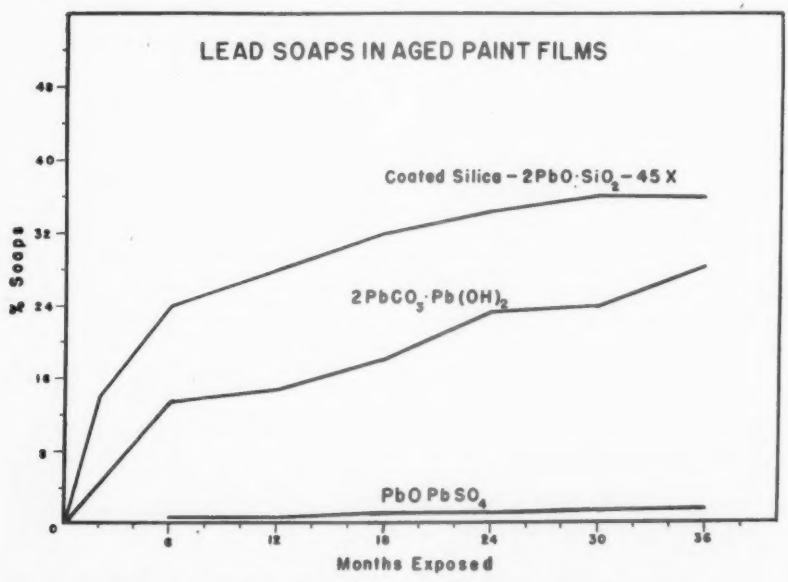


Figure 7. Graph shows reactivity of pigments over a 3-year period

of the 45X coating would have a low degree of reactivity, and similarly the reactivity of the silica portion of the fabricated particle would be nil. We do not feel that the larger amount of soaps formed with the basic silicate white lead

Electron Diffraction

ELECTRON diffraction appeared to be a natural means of resolving the surface coating on the pigment particles. Electron diffraction has shown considerable success in resolving oxide coatings on metals. Good electron diffraction patterns could readily be obtained from the straight silica particles, but relatively poor patterns were obtained from the coated SiO_2 particles. The data obtained from some of the electron diffraction patterns are presented in the paper, and the agreement of this data with the X-ray data is correlated. It is interesting to point out that in the fabricated 45X particle, some of the lines of each compound are resolved. This is

rather baffling, but a similarity was also obtained in the micro X-ray work.

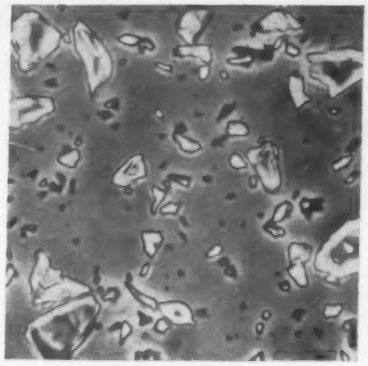
This electron diffraction data certainly shows that the silica particles were affected and that the compounds are at the surface, but an improvement in technique is needed to resolve all the strong lines of each compound. From this data, the thickness of the coating would theoretically be less than 0.2 micron considering that the electrons would not pass through the coating if it were too thick.

Settling Tests

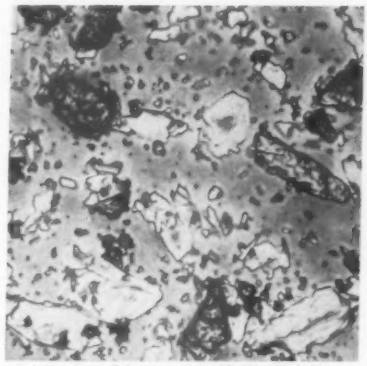
AN attempt was made to separate any free lead silicate, free lead sulfate or free silica particles that might be present in the 45X samples. This would be a means to show the degree to which particles were coated. The technique for making such separations would be settling tests with a heavy density liquid. The free silica particles would be held in suspension while the heavier lead silicate or lead sulfate particles would settle out. Liquids used for this test were Bromoform (d = 2.89), tetrabromoethane (d = 2.96) and a saturated aqueous solution of thallous formate (d = 3.2 at 25°C). In all settling tests, we were unable to make a separation of any free compounds. However, it was felt that possibly poor dispersion or flocculation made the problem more difficult. Wetting agents such as Tween #20, Triethanol amine, Aerosol 1B, Twitchell reagent and hexametaphosphate were added respectively in an attempt to obtain better dispersion, but still no clearcut separation of any of the compounds was achieved in the heavy density liquids. This is further evidence that the lead compounds must be combined with the silica.

Phase Microscopy

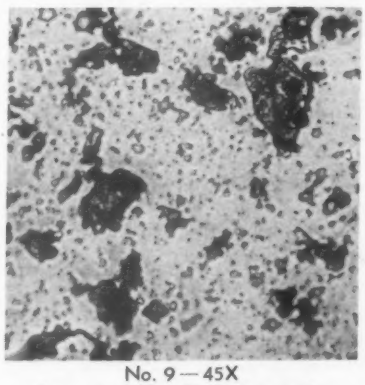
ANOTHER type of microscopy which helps to resolve the surface of particles is phase microscopy. Figure 9 illustrates three photomicrographs, #7, #8 and #9, taken with the phase microscope to illustrate the surface of silica particles versus the surface of basic silicate white lead. The fine structure on the surface of the 45X particles is a very potent force illustrating the presence of a coating. The silica particles, by contrast, illustrate a fairly clean surface or the effects of a slightly roughened surface due to grinding. The ground silica particles are from the same sample used for preparing the basic silicate white lead and the 50% mixture of the two. This series of photomicrographs emphatically depicts the coating on the 45X particles. In fact, it is amazing to think of the tremendous amount of surface area that is attacked and reacted to form a pigment of this character. These phase effects are all obtained optically but give results similar to those obtained chemically with the K_2S treatment. Color transparencies taken by phase microscopy illustrate the interference effect of the coating even better than these black and white photomicrographs.



No. 7 — Silica



No. 8 — Silica and 45X 50-50 Mix



No. 9 — 45X

Figure 9. Phase Photomicrographs

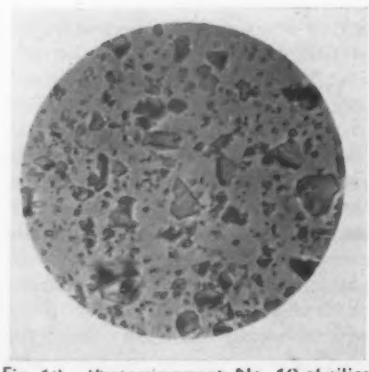


Fig. 10. Photomicrograph No. 10 of silica processed to 45X and coating extracted to produce free silica. Represents 1000X.

Extraction Tests

EXTRACTION tests with various chemicals were made in attempts to eliminate the monobasic lead sulfate from the surface of the 45X particle. It was felt the monobasic lead sulfate would be more readily soluble than the monobasic lead silicate. It was hoped that by taking away part of the coating, a better insight as to the structure of the coating would be obtained. Treatment with a solution of 50% ammonium acetate dissolved approximately 28% of the sample. This dissolved portion proved to be a mixture of monobasic lead sulfate and monobasic lead silicate. Both lead compounds were being extracted simultaneously. Microscopical examination of the resultant product left after extraction showed that it would stain slightly irregularly with potassium sulfide and to a lighter cast than the unextracted product.

Continued extraction and verification of the resultant products by X-ray verified that the monobasic lead sulfate and monobasic lead silicate were simultaneously being extracted from the surface. The longer the extraction period, the more of each product that was extracted until finally all the coating was extracted. No satisfactory means was found to extract just one compound and leave the other

Table I

Electron Diffraction Interplanar Spacing Pigment 45X	X-Ray Diffraction Interplanar Spacing Monobasic Lead Silicate	X-Ray Diffraction Interplanar Spacing Monobasic Lead Sulfate	Electron Diffraction Interplanar Spacing Silica (SiO_2)	X-Ray Diffraction[4] Interplanar Spacing Silica (SiO_2)
4.43		4.43		
4.27			4.21	4.22
	3.70	3.70		
3.58	3.48	3.50		
		3.34	3.33	3.33
3.22	3.20			
	3.12			
		2.95		
2.98	3.02	2.86		
2.73				
2.59	2.57			
			2.50	
2.45		2.47	2.47	2.45
		2.43		
		2.34		
		2.27	2.27	
2.22	2.23	2.23		2.23
2.11	2.14		2.12	2.08
2.03	2.04	2.05		
2.01	2.00			
		1.97	1.98	1.96
	1.90	1.91		
	1.87	1.85		
1.81	1.79		1.81	1.79
	1.75	1.73		
	1.64	1.66	1.67	
		1.65	1.65	1.64
1.60	1.60	1.61		
1.57	1.56	1.56	1.54	1.52

Electron beam — 50 KV accelerating potential
X-Ray diffraction — CuKα radiation

X-ray data used to plot interplanar spacings of various lead silicates and sulfates (fig. 4)

compound in the coating. The monobasic lead sulfate tends to dissolve while the monobasic lead silicate tends to form a gelatinous mass which frees itself from the silica core.

Microscopical examination of the silica core that remains after this extraction shows it to appear very similar to the original silica particles such as may be seen in Figure 10. This photomicrograph shows silica particles that have been processed to form 45X and then have been extracted to eliminate both the monobasic lead sulfate and the monobasic lead silicate. There is some surface irregularity, but in general the particle typifies the original silica. However, this surface would no longer stain or darken with K_2S showing that it had been freed of all the lead coating.

The evidence accumulated from the phase microscope, the transmitted light microscope, the X-ray, micro X-ray and electron diffraction patterns and the pigment extraction tests has presented positive evidence of the presence of the coating of lead compounds on the silica particles. Settling tests and chemical activity tests have also produced supporting evidence. The coating has such a fine structure it can not be resolved microscopically. Only the mass effect of the surface coating may be observed under the microscope. There are sections of particles that are more transparent or translucent than other parts which would indicate that the coating may vary in thickness and physical characteristics. In fact, some of our refractive index work would indicate that there are differences in the coating on some particles.

Because of the roughness of the pigment particle surfaces and the thickness of the lead coating, the surface area would be at least double the surface area indicated from the average particle size of the pigment. It is calculated that the ultimate particle size in the coating would have to approach colloidal size. In some sections, it may be one particle thick. The granular effect at the surface of the particles, as shown in the photomicrographs, is not true particle size of the coated particles but probably indicates the strong chemical activity that took place at the surface of the silica particles during calcination.

The pigment extraction tests indicate that both the monobasic lead sulfate and monobasic lead silicate are dispersed in the coating. The monobasic lead silicate tends to stain more slowly with potassium sulfide than the monobasic lead sulfate, but potassium sulfide shows the presence of both lead compounds. The X-ray evidence points to the fact that the dry phase reactions forming monobasic lead silicate and monobasic lead sulfate at the surface of the silica particles are completed. This work also shows that the coating may be extracted chemically with the silica core reverting to its original particle form.

It is hoped that this study might stimulate other work in this field to accumulate data to describe pigment particle surfaces.

The author wishes to acknowledge with thanks the help of *Mr. A. Stewart*, Director of Research for his advice and guidance and to *Messers. Kushner, Ostrofsky and Jacobsen* who conducted this test program.

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4. A.S.T.M. X-Ray Card Index

Solventless Wax-Resin Impregnants

By SAM RUGGERI
Project Engineer
Alaka Research Laboratories
division of
Lacquer and Chemical Corporation

THE USE of solventless impregnants for the protection of electrical and electronic equipment has become widespread, since World War II showed the need for this protection. A major problem with such equipment when sent to the South Pacific was failure due to moisture and to the growth of fungus on the equipment.

Deterioration due to moisture and fungus falls into two categories:

(a) immediate effects on the operation of the equipment.

(b) long time effects.

Of the two, the first is the more important for unless the equipment is adequately protected against moisture and fungi, the equipment will not operate from the very start. The long time corrosion effects are important from the standpoint of the useful life of the equipment.

Electrical and electronic equipment includes many components such as coils, resistors, condensers, and transformers, to name a few. Many of these components, in turn, include porous materials in their makeup. For instance, in many cases, coils are wound on vulcanized fibre or paper bobbins; resistors on porous ceramic cores. These components must be moisture-proofed by filling the voids in the porous materials, and sealing the components as units.

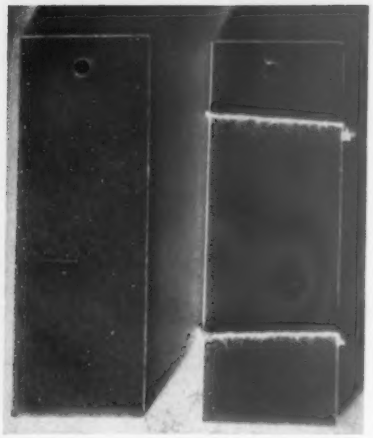
Hot Melts

ONE type of compound used in this application is the wax-resin-plasticizer blend, commonly known as a "hot-melt" or "potting compound". Hot melts, as the name implies, are solventless materials which are applied hot, in the molten state, and which solidify upon cooling. The molten compound fills the voids of the porous materials being treated. Since the hot melt does not contain any volatile solvents, additional voids which would result from the evaporation of solvents are not encountered. However, other problems arise.

Since hot melts, by their nature, must be thermoplastic, their softening and flow points are important. Obviously a hot melt must not flow at its operating temperature which is the operating temperature of the component. Such flow would result in the hot melt getting into places where it is not desired in addition to its not remaining where it is needed. On the other hand, the hot melt must be sufficiently fluid at a temperature which is low enough so as not to be detrimental to the component during the application (usually by impregnation).

At the other end of the temperature scale, a hot melt must retain its flexibility and adhesion at sub-zero temperatures. These two properties are governed mainly by the shrinkage factor of the hot melt in cooling down to low temperatures. If this shrinkage is high the compound will pull away from the surfaces to which it is adhering, allowing water to get into the component through the channels thus created.

This temperature range is necessary since equipment is subjected



Funginertness of hot melts: Test specimens of a funginert material after exposure to tropic conditions for 28 days. Specimen on left shows absence of fungus growth; specimen on right, with strings attached, shows absence of fungus growth on specimen proper and presence of fungus growth on and stemming from the strings.

to all sorts of temperatures. For example, equipment installed in aircraft operating in the South Pacific during the last war, was subjected to the changes in temperature when going from the hot, humid conditions on the ground to the cold, dry conditions at high altitudes.

As a result of our sad experiences during the war, due to the growth of fungi on equipment, designers and manufacturers of electrical and electronic equipment are now specifying, wherever possible, materials which are funginert (naturally resistant to the growth of fungi).

Deterioration

THERE are two schools of thought in regard to the growth of fungi on equipment. One school contends that the moisture is the primary cause of the deterioration and the other that the fungi are equally important in this deterioration. Moisture is an important factor in tropical deterioration but it is neither the only nor the main cause for such deterioration. The fact that fungi are growing on the equipment indicates that moisture has penetrated into the equipment. Also, as the fungi grow on the components and materials they concentrate moisture at the surface of the component thereby increasing the possibility of electrical leakage and shorting of circuits where this possibility might not have existed prior to the fungus growth. Further as fungi grow on equipment they consume the materials they are growing on and are forming metabolic products which are usually of a corrosive nature. This leads to corrosion in places where it would not otherwise occur. Therefore a desirable property of the hot melt is that it be funginert. Funginertness is different from fungistatic effectiveness which is derived from the incorporation of chemicals or other fungicides.

Briefly, then, solventless hot melts must possess the following properties:

(a) compatibility of the various ingredients

(b) stability at application temperatures

(c) relatively low application temperatures

(d) relatively high softening and flow points

(e) good adhesion and flexibility at room temperatures and at low temperatures

(f) low shrinkage factor both on solidifying and on cooling

(g) high resistance to passage of moisture (low porosity)

(h) good electrical properties (dielectric constant, dielectric strength, power factor, effect on "Q") at low temperatures, room temperatures, and at elevated temperatures

(i) should be funginert.

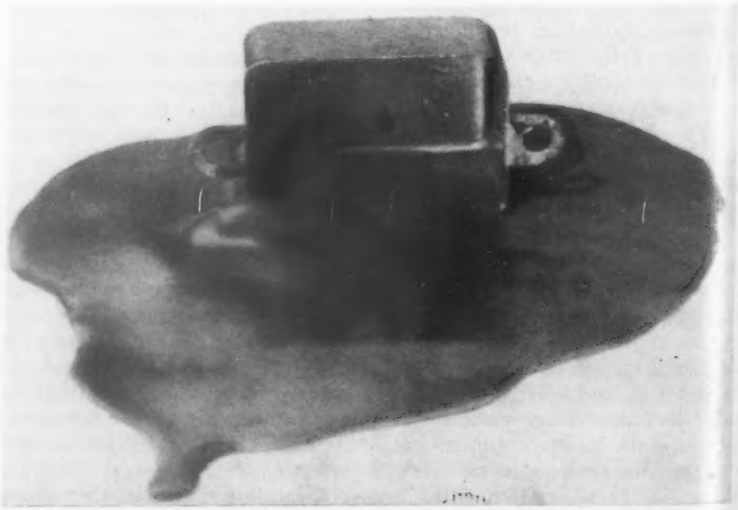
This list of properties may seem very critical and demanding of a compound which is formulated using materials which may vary quite a bit in themselves. Yet, when it is realized that the function of a comparatively small amount of compound is to prevent failure in the operation of equipment whose cost may well run into thousands of dollars, no list of requirements is too stringent.

Methods of Testing

Compatibility of Ingredients. The determination of the compatibility can be done by many methods. To list these methods would involve a survey of the various methods of compounding raw materials into finished formulations.

The simplest method is to melt-down together the various ingredients in a suitable pot, with stirring and allowing the resultant mixture to solidify. Where such a melting and mixing operation results in a homogeneous, compatible mixture the problem is simple. In such cases where simple melting does not yield a compatible mixture, other compounding methods may do so and should be investigated.

An example to illustrate this can be found in the formulation of hot melts based on ethyl cellulose. During the heating and melting of the waxes, ethyl cellulose and other ingredients, the heating required for dispersing the resin in the wax and plasticizer, in many cases, results in the degradation of the ethyl cellulose. In such cases,



Flow point of hot melts: Specimen has been subjected to temperature above its flow point.

milling the ethyl cellulose into the plasticizer (such as on a Banbury Mill) will lower the temperature required to disperse the resin in the wax and plasticizer.

Stability at Application Temperature About 1 pint of the compound is melted and poured into a stainless steel beaker. The beaker is then placed in an oven which is set at the application temperature of the hot melt. At 24 hour intervals a copper panel is dipped into the compound, withdrawn and allowed to cool. The compound is observed for change in color, lumping and charring. The heating is continued for a period of 10 days. The copper panels are subjected to low temperatures in order to evaluate changes in the physical properties at low temperatures after exposure to high temperatures. (See flexibility and adhesion at sub-zero temperatures.)

Determination of Flow Point. Two small metal cans with dimensions of approximately 1½" x 2" x 1" (such as a metal bathtub-type capacitor can) are filled with the molten compound and allowed to set at room temperature overnight. One of the cans is then placed, on its longest side so that the exposed surface of the compound is in a vertical position, on a piece of cardboard and then placed in an oven whose temperature is set at 85°C. The can is allowed to come to the temperature of the oven and remain at that temperature for 30 minutes. The compound is then examined for signs of flow. The temperature is then increased in intervals of 5°C until the temperature at which the compound flows is determined. After this temperature has been determined the temperature is reduced 5°C and the second can is exposed to this temperature for 48 hours in the same position as the first can. If no signs of flow are noted after this exposure, this temperature is considered the maximum operating temperature for the compound.

Flexibility and Adhesion at Sub-Zero Temperatures

A small copper panel is dipped into the molten compound, withdrawn, and allowed to cool to room temperature overnight. The panel is then exposed to -40°C for 1 hour after which the panel is removed and allowed to warm to room temperature. The panel is then examined for cracking and chipping off of the compound from the copper panels.

Funginertness of hot melt: Laboratory humidity exposure chamber is shown in above photo.

Funginertness of hot melts: Note stainless steel rack which is loaded with test specimens.

Percent Volume Shrinkage on Solidification

A Hubbard Specific Gravity bottle is used in this determination. The hot melt is heated to its melting point and the molten compound is poured into the bottle. The ground glass cover is placed on the bottle and the excess hot melt forced out through the capillary in the stopper. The bottle is allowed to cool to room temperature (25°C) and weighed. The stopper is then removed and the bottle is filled with water at room temperature (25°C), the stopper is replaced and the excess water forced out through the capillary as above. The bottle is then reweighed. The percent volume shrinkage is then determined using the following formula:

$$\text{Percent volume shrinkage} = \frac{(w' - w)}{(d)\ (V)} \times 100 \quad (1)$$

where: V = volume of Hubbard Specific Gravity bottle (at 25°C)
w = weight of bottle + wax (at 25°C)
w' = weight of bottle + wax + water (at 25°C)
d = density of water (at 25°C)

The volume of the bottle is determined by weighing the empty bottle and the bottle filled with water (at 25 C). The volume of the bottle is calculated as follows:

$$V = \frac{W' - W}{d} \quad (2)$$

where: W weight of empty bottle
W' = weight of bottle filled with water at 25°C
d = density of water at 25°C

Shrinkage Rate on Cooling

The Hubbard Specific Gravity bottle containing the hot melt used in the determination of percent volume shrinkage on solidification is used. The stopper is removed and the bottle is placed in a water bath set at 0°C. After allowing the bottle to come to equilibrium in the water bath, the bottle is filled with water at 0°C, the stopper is replaced and the excess water forced out through the capillary in the stopper. The bottle is then reweighed. The shrinkage rate on cooling is then determined using the following formula:

$$\text{Shrinkage rate on cooling } \frac{(cc/cc°/C)}{} = \frac{v_{25} - v_0}{(v_{25})} \quad (3)$$

where: V_{25} = volume of wax at 25°C
v_0 = volume of wax at O°C

The volume of wax at 25°C is determined as follows:

$$v_{25} = V - \frac{(w' - w)}{d} \quad (4)$$

where: V = volume of Hubbard Specific Gravity bottle (at 25°C)
w = weight of bottle + wax (at 25°C)
w' = weight of bottle + wax + water (at 25°C)
d = density of water (at 25°C)

The volume of wax at O°C is determined as follows:

$$v_o = V_o - \frac{(w'_o - w)}{d_o} \quad (5)$$

where: V_o = volume of Hubbard Specific Gravity bottle (at 0°C)
w = weight of bottle + wax (at 25°C)
w'_o = weight of bottle + wax + water (at 0°C)
d_o = density of water (at 0:C)

The volume of the Hubbard Specific Gravity bottle at 0°C can be determined as noted above for determining the volume at 25°C but substituting water at 0°C for water at 25°C or it can be calculated (approximately) by making use of the coefficient of cubic expansion for glass.

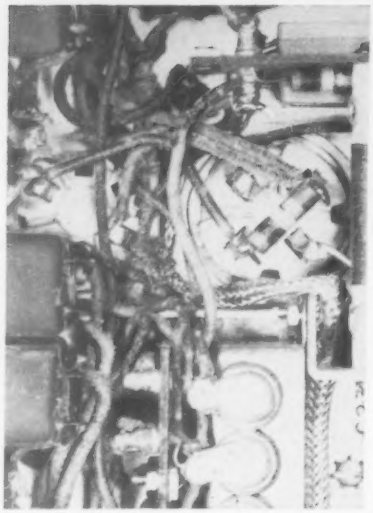
Resistance to Passage of Moisture (Porosity)

Three brass rods ½" in diameter and 8" in length are dipped into

the molten compound, withdrawn and allowed to cool to room temperature overnight. Each of the coated rods is then placed in a separate electrolytic cell. Each cell is composed of a glass container in which is placed a 5% salt solution as the electrolyte. The coated rod is immersed to a depth of 6" and a wire lead is attached to the rod. The other electrode is simply a length of Nichrome wire. An initial reading is made of the resistance between the two electrodes with the single-throw double-pole switch open so as to isolate the cell. A DC potential of 120 volts is then impressed across the cells. At periodic intervals, each of the switches is opened to isolate the cell and a resistance reading is made across the electrodes. The potential is impressed for a total of 50 hours or until the lamp goes on to indicate a flow of current across the cell. As each cell breaks down the lamp is removed from its socket, thus isolating the cell from further test. At the end of 50 hours, a minimum resistance value across the electrodes of 1 megohm indicates a satisfactory coating. Figure 1 shows a schematic diagram of the test set-up.

Electrical Tests on Hot Melts

For details on the various electrical tests on these hot melts the reader is referred to the ASTM Standard D-176-44 which covers Standard Methods of Testing Solid Filling and Treating Compounds Used for Electrical Insulation. This specification covers extensive electrical tests such as dielectric strength, power factor, and dielectric constant.



Close up of electronic equipment which has been made inoperative by growth of fungi and by the penetration of moisture into components. Funginert hot melts help to prevent this condition.

Funginertness of Hot Melt Compounds

The molten hot melt compound is poured into suitable molds to form eight test specimens; each one 1" x 3" x 1/8". A hole (1/8" diameter) is drilled into one end of each of the specimens. Pieces of 3-ply cotton string, conforming to the requirements of Federal Specification T-T-871a, Type I, are tied to four of these specimens to serve as a known source of nutrient. The eight specimens are suspended by stainless steel wire hooks from a stainless steel rack. Additional pieces of string are attached to the rack to serve as separate controls.

The specimens are inoculated by spraying a spore suspension of the test fungi [1] onto them with a small hand atomizer. The rack is then placed into a round glass battery jar containing enough distilled water to cover the bottom of the jar to a depth of half an inch. Silicone grease is applied liberally to the ground edge of the jar and a watch glass is then inverted over the top of the jar, thus forming a water-tight humidity exposure chamber. The jar is then placed in an incubator which is set to 30 5°C and exposed for 28 days to simulated tropical conditions of 100% relative humidity.

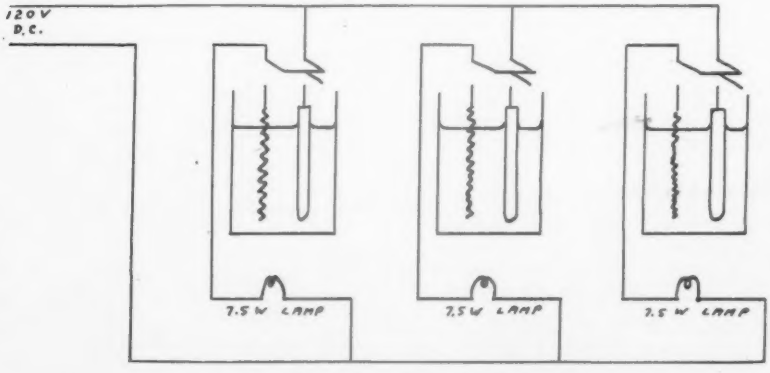
At the end of the incubation period, the watch glass is removed and the rack is taken from the jar. The separate pieces of string tied to the rack should show profuse fungus growth. Next, the specimens without strings attached are observed for fungus growth on the surfaces. Fungus growth covering more than 2% of the surface area of any replicate indicates fungus susceptibility. Fungus growth covering 2% or less of the surface of the four replicates is indicative of either a fungistatic or a funginert material. [2]

To differentiate between these two types of fungus resistance, the four specimens with strings attached are observed. Fungus growth starting at the string and extending to a distance of at least 1mm on at least 2 of the 4 specimens indicates funginertness. Absence of this growth stemming from the string and extending over the surface of the panel indicates the presence of a fungicide in the hot melt.

[1] The following fungi are used in making up the spore suspension used to inoculate the test specimens:

	American Type Culture Collection Number
Aspergillus niger	9642
Aspergillus flavus	9643
Penicillium luteum	9644
Trichoderma T-1	9645

[2] A funginert material is one which is inherently resistant to the growth of fungus due to the absence of nutrients for fungus growth, while a fungistatic material is one which derives its resistance to the growth of fungus from an added agent (usually chemical) called a fungicide.



Schematic diagram of test set up for determining resistance to passage of moisture by a hot melt. This indicates the porosity of hot melt.

PART VIII

RESEARCH AND DEVELOPMENT TECHNICS FOR PAINT PRODUCTION METHODS

By
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General Electric Co.

This eighth article in our series discusses Development Technics as guides for action in determining product diversification, establishing a product line, setting up controls, effective instrumentation, assuring cost reduction. The next article in this series will discuss Research and Development of Raw Materials for the Coating Materials Industry.

LABORATORY research, product development and sales development deal with the understanding and use of information which is naturally convergent in character. Once trends and underlying principles are established, data tends to focus and converge on a solution.

Paint production development, in contrast, deals with a large number of industrial, business, and technical matters primarily divergent in character.

Establishing a trend and defining a basic principle in one individual component in this type of a situation does not tend to focus, converge with other principles, and lead to a solution.

Paint production development has to bring together information on the various phases of manufacturing equipment, materials handling, formulations, control labor, costs, accounting, supply, and distribution, and converts to understandable progressively increasing improvements.

Research and development methods can as readily be applied to a divergent set of circumstances as to a convergent set. Production development groups are actively engaged in operations today, and with increasing success define the variables involved in the apparently contradictory components of an industrial situation on the basis of known cause-effect relationships.

The first step in a paint production development operation corresponds to the first step in any research procedure. The first step being informational analysis through the stage of classification of information, and finding the facts to close in the loopholes in the information available.

RESULT OF CLASSIFICATION

WHEN his subjects are clasified, the paint production

Editor's Note: This discussion is based on the varied personal experiences of the author. The facts and examples cited do not necessarily represent the practices of any single company.

COMPARATIVE CHARACTERISTICS OF TWO TYPES OF PAINT PRODUCTION

Equipment Type	Volume Product Required	Product Life Required	Production Rate	Material Losses	
Specific to one material.	High	Must be long.	Very high.	Constant low.	Large unit size — greatest unit efficiency — minimum to no flexibility.
Not specific to any material.	May be variable.	May be variable.	Uncertain varies with product.	Uncertain varies with product.	Low unit efficiency maximum flexibility possibly many small units.

man realizes that certain situations he has to consider do not specifically arise from paint manufacturing, but they occur commonly to all industrial operations. When his problems are so understood, he can direct himself toward specific data in the growing body of industrial research literature being accumulated.

Next in the system of classification appear problem situations, the solutions to which are primarily the responsibility of the paint production department, but where the research and development and informational background is supplied by groups other than those responsible for paint production.

A production group starts out manufacturing the items of a product line, and continuously lives with modifications, additions and changes made to it. Two considerations about a product line are non-static and need repeated resurvey. First — what products that can be made should not be made, next, why products that can be made are not being made. Settling on a product line, and deciding on each modification, can be the result of one of three types of operation. The most desirable type is that based on adequate research and development background obtained by cooperation between production, development and sales groups. This would naturally include completed survey information in relation to equipment, scheduling, costs, material, volume, control and certain other items we plan to discuss herein. A second method for settling on a product line is the setup where direct responsibility is the function of sales. This has the advantage of prompt adjustment to market trends and rapid adoption for cancellation of products. It is apt to be less stable than the research approach and to neglect the possibility of material that can be manufactured economically and profitably in existing equipment, such possibilities being apparent to a production group and not necessarily in the immediate consciousness of a sales group. The third influence operating toward product line establishment can be called "operation by impulse". As a result of "impulse" factors, a product line is apt to contain a large number of items for similar uses, to contain items "a special for anybody".

The planning and developing approach to product line invariably considers the problem associated with diversification. The role of diversification increases when the paint production man considers two additional ever present subjects — (a) The "keeping going" problem and (b) the base "break-even-point".

An explanation — it has been apparent for many years that a wide diversity within a product line combined with a large or medium size total production, skyrocketed the already large number of individual factors in connection with control of paint manufacture. Industries, other than paint manufacturing, have with varying success handled large scale production situations. Production, large in diversification, in various numbers of items and volume, is however relatively new within the paint industry and poses serious problems of scheduling, process control, waste control, materials handling, and warehousing. To enable the development of organizations to handle, understand and act intelligently as a result of utilizing an ever increasing body of data, research and development groups have been set up within production departments. These groups have been established under various names, but in function they are devoted to research and development in "Industrial Accounting."

Many paint production departments today are looking to research and development in Industrial Accounting as a means of guiding to more effective operation.

Industrial Accounting research groups have evolved, even at this early stage of event, certain fundamentals:

1. Total figues are not altogether an advantage. As in any other research, it is individual data that has significance. The selection of what data should be analyzed becomes an evaluational problem in itself.
2. Products basically for many industries tend to remain at established levels of production. Products specifically for a *single* industry, or a *few* industrial end uses, fluctuate rapidly in production requirements. Production of these latter items becomes expensive in scheduling, inventory, non-constant control experience, loss through clean-up of equipment.
3. Too many records, reports, and figures can lead to "over management", a condition where the objective tends to become concentration on the development of data, rather than the desirable concentration on "action as a result of information." The "significance-for-action" result must be developed to greater prominence. This points out that industrial accounting differs from financial accounting, in its applicability. Financial accounting being primarily historical, industrial accounting being in a true research sense "informative of trends" and a tool for prediction.

The paint production man has his own special viewpoint on diversification. He wants maximum diversification in those industries to which his products are shipped, but minimum diversification where his own process technics, controls and raw material types are concerned.

The group responsible for production requests periodic informational review on the questions (1) how diversified can our line be based on our present equipment and know-how, and (2) what effect new equipment would have on

material and process diversification, and on new possible product end uses. This informational audit becomes the first point in the production development steps covering (a) informational analysis, (b) forward planning, (c) implementation of plan, and (d) control.

Alternate Formulations

THE matter of alternate formulations is another problem which is the natural responsibility of the paint manufacturing group; but information on which decisions are made comes from a laboratory organization distinct from processing.

Since paint is manufactured against performance requirements, various alternate raw materials can be used to make, and be present in, the final paint product. In this way, the paint industry differs from the chemical industry where the composition of the final product may not vary. Alternate paint formulations are required due to the interplay of raw material availability, price, supply and competitive action. Competitive selling price, being a summation of competitive formulation, competitive purchasing, competitive manufacture, and competitive distribution. The first three of these being a production responsibility. Sufficient laboratory developments aimed at formulation alternates must be initiated by the production department and tested and rechecked results must be maintained by production in systematic and available form. These should be repriced in accordance with market changes, comparing with costs of material in actual production and changes promptly made when total advantage is indicated.

Paint Manufacturing Groups

THIRD in the system of classification of activities of paint production development groups, appear those operations within the normal boundaries of a production department.

In this group we see the rapid extension of control development. Properly applied controls — and the proper application is a development function — enable: 1, processing cost reduction, 2. reduction of operating intangibles. 3. simplification of production methods, 4. reduction of consumer complaints.

Production departments realize that a production man's understanding of any situation increases as the pertinent figures he has about it increase.

The balance of control distribution is becoming recognized for a control function as equal in importance to the individual control itself.

Do you know the company which has set up stringent control requirements on incoming materials, but has only uncertain methods on processing control? Then get a running record of customer complaint over a few months that this company has. Keeping the complaint record as a standard, increased the stringency and accuracy of process control. Then when you draw up a chart of important controls imposed on process, you will see how this improves the customer complaint picture when this is analyzed for a corresponding period with the production control. You will also see those special places where minimum material control should be increased and many places where incoming material control can be relaxed. You will be able to recommend a balanced overall control setup. This may even be more economical than the original setup.

Product specification and final product control presents a recurring problem. Can a company have a series of individual final product specification and not actually run control tests on each one of the final product specifications? How many companies are attempting to do just this? Like other development techniques, the control technique is a technique of action. The process of explaining variations from a normal standard is in itself a step toward more detailed process understanding and the direct lead to process simplification.

The stage of precision of control work can be gauged by the type of control standard in actual use. The first control standard is, from natural origins, and assumed "arbitrary standard". The retention of the arbitrary standard as the permanent standard indicates an unrealistic approach to control and an inability to handle, and a lack of awareness of, further control problems. Normally, as control data is collected, an experience factor becomes evident and a new standard can be set up based on results known to come out of a process. Call this an "experience standard". It indicates an awareness of need for standardization. When experience data is subjected to statistical treatment, an "engineered standard" becomes available. Working from an "engineering standard" as a base, analysis of process and material variables can be effectively carried forward. "Engineered control standards" can be applied to regulate the quality of finished products and to indicate process adjustments at various stages of production. A new aspect of control appearing in the paint production field is "yield control". Yield control becomes important in considering the production of the same paint formulation in different size units; in determining what happens when a formulation is taken from the laboratory to the plant; in determining the effectiveness of the utility of raw materials. Do you know in your plant how many pounds of pigment get into a formula from a 50-lb. bag of pigment? How much paint is lost when one batch of paint is produced in a pebble mill; how many batches must be made before the loss approaches standard? Do the material losses in producing a paint in a pebble mill amount to more dollars than the labor charges for running it in a roller mill? Explaining the "why" and correcting the thus discovered causes for variance from an engineered standard, become long steps in "cost reduction control".

The next set of considerations within the normal activities of a paint production department appears the rather perplexing subject of equipment.

Due to competitive pressure and greater understanding by the customer of specific requirements, production equipment assembly tends to take the course directed to production at lowest possible costs. This means increased emphasis on materials handling equipment and dispersion equipment specifically

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All-Purpose Valve for the Paint, Varnish and Lacquer Industry

By C. J. KENTLER
Application Engineer
Rockwell Manufacturing Co.

TO anyone familiar with paint, varnish and lacquer production, the idea of using one valve to handle the multitude of services sounds almost impossible. However, the Nordstrom lubricated plug valve has proven capable of performing the job.

This valve was originally developed for use on mine slurries which is undoubtedly one of the most difficult services encountered even today. The results were so satisfactory, that the valve was tried on other easier services and gave a good account of itself. One feature of this valve which increased its popularity was the quarter turn operation assuring quick opening and closing.

There is probably no other industry that has to handle the variety of liquids that the paint and varnish industry encounters. The liquids range all the way from solvents and thinners to viscous basic oils and even pastes and suspensions that are used in paint making. In the case of the basic oils, such as tung, dehydrated castor, soybean, tall and linseed oil, the viscosity ranges from approximately 3,000 SSU to approximately 70,000 SSU. On the Gardner-Holt Viscosity Table, this ranges from T to Z-6. Converting into terms of specific gravity, the range is from less than one up to six or seven times the weight of water.

Varnish Manufacture

In the case of varnish making, particularly difficult conditions prevail, such as the addition of filter aid which is abrasive, in the varnish clarification process, and the handling of hot varnish at temperatures up to 600 deg. F. This lubricated plug valve with its tapered plug construction and unexposed seating surface can handle slurries and abrasive solids, without danger of the solid material getting into the seat and preventing complete shut-off. For hot varnish service, these valves in type 316 stainless steel, are manufactured with a welded stellite coating on the plug surface to insure trouble free operation, and complete shut-off at the extreme temperatures required. Varnishes of high viscosity can be controlled by these valves without difficulty because the plugs are lubricated and will turn easily.

In the "old days" a paint plant usually consisted of a few open mixing or blending vats, grinding mills and tanks. But with the advent of synthetic paints and varnishes, lines have to be closed. Valves have to be corrosion resistant as well as insuring complete shut-off.

In the ultra-modern, million-dollar plant of *Pacific Paint and Varnish Company* in Berkeley, California, a well engineered piping arrangement permits safe and effective handling of the materials to be blended and cooked. The process vessels were designed to manufacture both oleo-resinous and synthetic alkyd resins. Stainless steel construction was used throughout including reaction vessels and scrubbing systems.

Each of the three high vacuum varnish kettles is equipped with a "filling" valve consisting of a funnel attached above a type 316 stainless steel vavle.

The stainless steel valve's plug is merchrome coated (welded coating of stellite #1) to prevent galling and insure complete shut-off at 600°F. Quick opening and closing of the funnel valve is necessary so that a minimum amount of outside air enters the kettles.

Victor E. Perry, superintendent of the resin plant, says, "This valve opens wide with a minimum restriction and closes cleanly despite

subliming phthalic anhydride vapors, and the lubricant permits the valve to operate easily and seals it tightly against a high vacuum."

Each vessel is also equipped with an eight inch size gear operated Nordstrom Hypreseal valve which holds the vacuum.

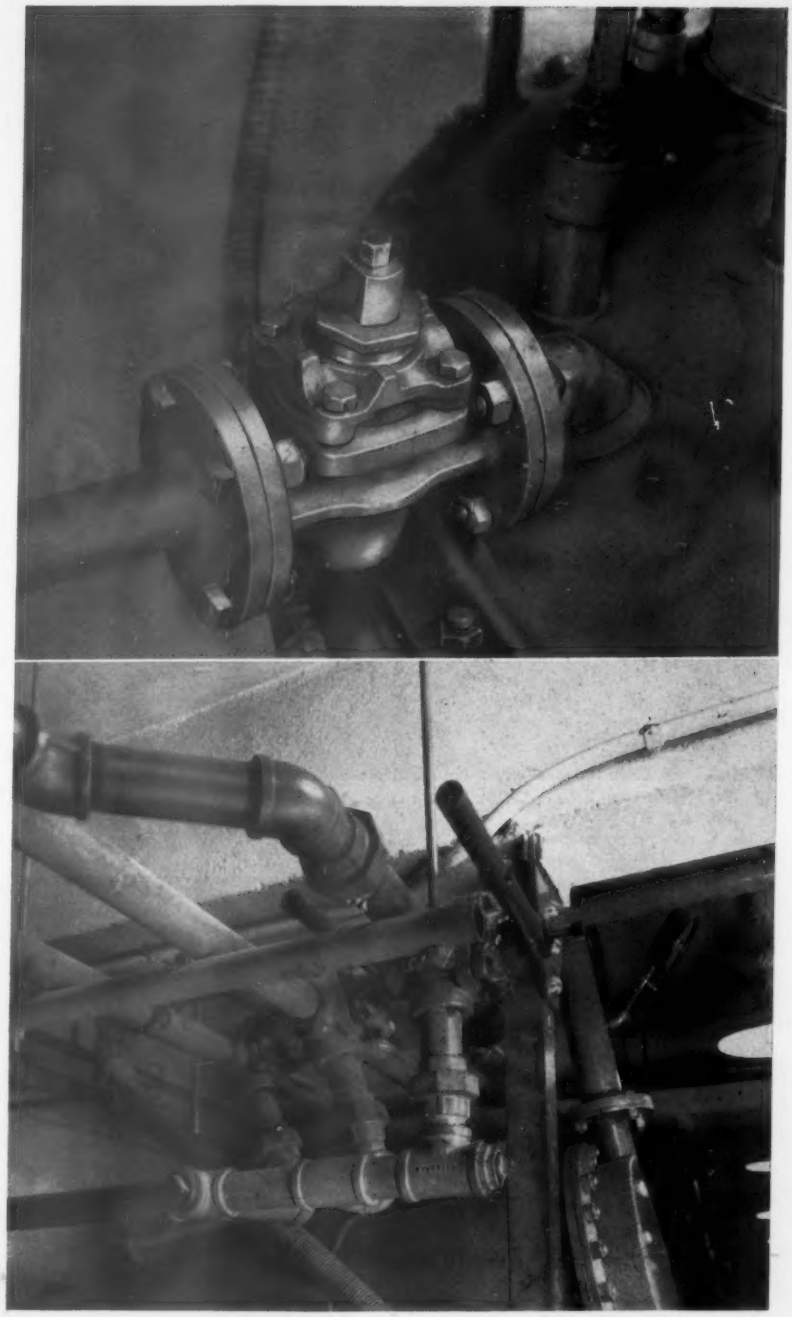
Paint Manufacture

Most paint manufacturers like to have manifolds so that they can run all their solvents and paints through the same piping and valves in order to make their processing more flexible. Some valves which can handle thin solvents will not give complete shut-off or permit smooth flow of paint mixtures or slurries. This means there are likely to be paint leaks on the floor, which makes the paint an "unsightly mess". Leaks also mean loss of material and the frequent clean-up of floors.

Valves that readily handle slurries and dispersions, may not give complete shut-off when carrying solvents and thinners. Leaks in solvent lines are particulary hazardous as solvents dripping on a hot kettle for instance may cause a serious fire. Many plants are using steel valves instead of cast iron near hot reactors and kettles for safety reasons. A cast iron valve accidentally heated by a fire may rupture and allow the escape of fluid which may ignite and further increase the fire.

A Chicago paint manufacturing firm, Stewart-Mowry Company has just completed a two year series of tests to determine the type valve best suited to their operations. Liquids involved in the experiments included mineral spirits, various kinds of varnishes, raw oil, linseed oil, tung oil, naphtha, and cobalt and other driers. *F. M. Gundrum*, president of Stewart-Mowry, reportsbest results with Nordstrom Valves. In addition to eliminating leakage, this type of valve is out-lasting those formerly used ten to one, according to Mr. Gundrum.

Stewart-Mowry Company uses a considerable number of semi-steel three-way valves on a blending manifold and also for testing on lines carrying varnishes, oils and driers. In a paint plant most of the services can be handled very satisfactorily with semi-steel valves. For this reason most of the valves in the Stewart-Mowry Company plant are semi-steel.



Top: Stainless steel Nordstorm valve with Merchrome coated plug handling hot varnish to kettle in Sherwin-Williams plant. Bottom: 2-inch three-way Nordstrom valves on varnish lines.

The operating department is pleased with the fact that these valves permit complete shut-off regardless of the liquid in the line eliminating leakage which always means lost time as well as material. The maintenance department is pleased because of the reduced maintenance time required in using these valves. When the valves are properly lubricated, there is no possibility of the valve sticking even if paint should remain in the line for a long time and get hard. In cases where valves are neglected and it is necessary to repair them all that has to be done is for the plug to be removed from the valve, which can be done without taking the valve from the line, and the paint can be cleaned off with a solvent. Maintenance men have

Chemist at blending maniford at Stewart-Mowry Paint Company.

running more quickly, if the piping and valves that they have to work on can be readily reached.

Service Lines

In addition to usage on process lines these valves also do an excellent job on service lines, such as water, air and fuel gas. Because such valves give complete shut-off they are being used on gas services in pressure ranges from a few pounds up to 5,000 lbs. per square inch. Most of the large gas transmission lines in the United States are equipped with this type of a valve for safety reasons. This is a case where complete shut-off is necessary in the event of a leak in the pipe.

In vacuum services they have held at absolute pressures less than ten microns, even with "gunk" present in the lines.

Basic Principle of Valve

The lubricated plug valve with the tapered plug makes use of the scientific principle known as "Pas-

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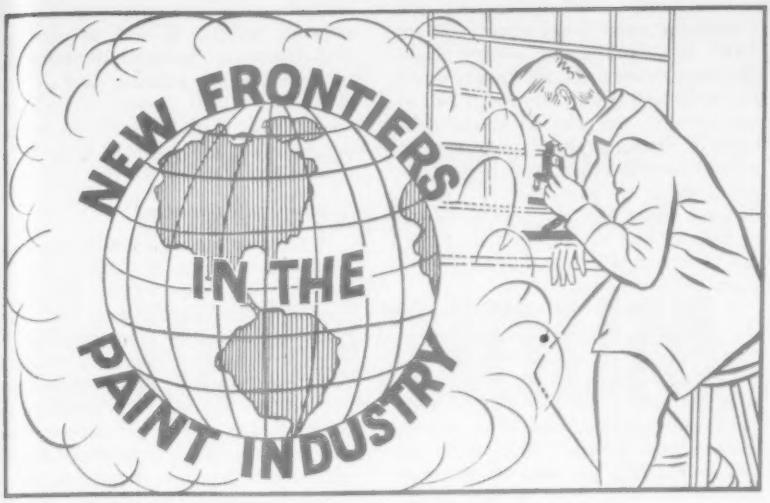
also found that their stocking problems are improved, for by standardizing on one make of valve the accounting work is simplified. The stocking of parts also becomes less costly.

To further simplify operation problems in the paint and varnish industries, some general rules concerning piping and valves should be followed. In general it is a good idea not to use piping less than two inches in diameter for any paint lines, and not less than one and one half in diameter in any varnish line, due to the fact that build-up occurs when material stays in the pipe any length of time. This, of course, means that the effective diameter is reduced considerably and over a period of years a two inch pipe may be reduced to less than one inch in diameter. It is always an excellent idea to have the piping and valves in accessible positions for even in the most smoothly run plant, there is likely to be clogging of the piping and valves at times. The maintenance department can do their repair job more effectively and get the plant

Two-inch Nordstrom valves on a varnish manifold.



Porcelain Enamels vs. Organic Finishes

By

PHILIP HEIBERGER

PORCELAIN enamel, with its characteristic resistance to corrosion, permanent gloss, remarkable hardness and durability, possesses in abundance many of the very attributes which paint formulators have striven for years to impart to paints. In a sense, it might almost be stated that the more closely a paint approximates porcelain enamel the more desirable it becomes as a protective and decorative agent.

Were it not for three major defects, porcelain enamels, rather than organic coatings, would probably have dominated the finishes industry long ago. These defects are; 1. Tendency to chip. 2. High cost. 3. Limited applicability to iron and steel.

Until recently these disadvantages limited the use of porcelain enamel so severely that it hardly constituted a threat to the paint industry. Except for a few specific, relatively expensive, heavy-weight and permanent items, such as stoves, bathtubs, sinks, chemical process equipment and the like, porcelain enamel had earned no significant place in the finishes field.

Revolutionary developments of the past five years, however, have radically altered the picture. New methods of production and new types of ceramic coatings, devised to lower cost, decrease chipping and increase versatility, have been introduced and are being improved constantly by ceramic engineers. They may well catch paint people off guard.

In an attempt to offset such an eventuality, the following information is being offered. Intimate knowledge of competitive products often proves a lucrative source of ideas for one's own product. From awareness stems progress. If porcelain enamel can be modified into active rivalry for traditional paint uses, perhaps, conversely, some of porcelain's desirable qualities can be incorporated into paints.

With this as our premise we will explain briefly what procelain is, how it is made, its advantages, restrictions, applications and potentialities as a serious competitor for the finishing dollar.

Compared to the best organic finish known today, procelain is harder, tougher, more durable and more corrosion resistant. This superiority is graphically illustrated by the following table:

Moh Hardness	4-6
Acid Resistance	Highly resistant
Alkali Resistance	Not resistant to hot alkali solutions.
Temperature Resistance	600-1000° F
Abrasion Resistance	High
Weathering	Not affected
Organic Solvents	Resistant to all
Ultra-violet light	Not affected
Diffuse Reflectance	As desired up to 80%
Total Reflectance	As desired up to 85%

An organic finish with these physical properties would make history. And with such properties, the stability and growth of the porcelain enamel industry is not hard to understand.

From the standpoint of versatility and range of use, however, organic finishes enjoy a primary advantage in that they can be applied to practically all common metals in an almost unlimited number of colors and degrees of gloss. Organic coatings, moreover, are comparatively cheap and flexible. Where as a ten to one cost factor is not unusual, porcelain enamel is further handicapped by an inability to be "touched up" after chipping.

On the other hand, recent adaptations of the relatively ancient art of porcelain enameling have made it suitable for a variety of consumer and industrial products which were previously the exclusive province of the paint manufacturer. An important innovation has been the thinner coating which reduces chipping tendencies without sacrificing corrosion resistance. Firing temperatures have been lowered, reducing costs, facilitating manufacture and making possible the development of an enamel for aluminum. Better enameling sheet stock has been introduced. All of these factors merit consideration.

What is Porcelain Enamel?

Porcelain enamels are composed of inorganic glass-like materials fused onto base metals at temperatures on the order of 1500° F to give a tightly adhering, hard and durable finish. Frit is the principal material comprising the porcelain enamel. It is made from several key ingredients. The principal components are silica, feldspar and clay. Basic materials such as borax, soda ash, cryolite, fluorspar, sodium nitrate, zinc oxide or lithium compounds are used to flux the silica. The porcelain enamel is opacified by pigments such as titanium oxide, antimony oxide, lead oxide and tin oxide.

Frit is manufactured by mixing intimately the requisite quantities of the above mentioned raw materials. The mixed batch is placed in a pre-heated furnace, called a frit smelter, where the temperature is raised to about 2300° F. At this high temperature the charge melts and fuses together; after degassing, it is discharged into a tank containing water. As a result of the sudden cooling, the melt shatters while solidifying. The glassy particles thus formed are the frit. There are probably as many different varieties of frits as there are coating resins.

Porcelain enamels are made by incorporating with the proper frit small proportions of electrolytes, opacifiers, water, ball clay and inorganic coloring pigments. In general, these additions seldom exceed 15% of the frit. The mixture is ball-milled until the frit is

broken down into particles smaller than 200 mesh. The milled mixture is known as "slip."

Because of the high temperatures involved in fusion, only parts made from temperature-stable heavy-weight metals can be coated. The first or ground coat of slip is usually applied by dip methods whereas the top or finish coats are usually applied by spraying. Ordinarily, one to three finish coatings are required. Between coats, the parts are placed in a low temperature oven in order to remove the water. For a final fusion, the slip coated parts are fired in an enameling furnace at temperatures ranging from approximately 1400° to 1800° F. Depending upon the type of porcelain enamel and the nature of the base metal, firing periods range from several minutes to as long as one hour.

Properties of Porcelain

Porcelain enamels may be produced in a variety of finishes from an extremely high gloss to a dull flat. They are also available in wood grain and marble-like patterns and in speckled designs and various other novelty patterns. All colors and shades of porcelain enamel are available although not every color in every grade, but white is the most popular. In general, the colored porcelain enamels are more durable than paints. For absolute permanency, a thin clear overspray of acid resisting slip is often used. Without this protection light yellows and reds would tend to fade.

Different types of porcelain enamels vary considerably in chemical resistance. There are some enamels that are so acid resistant that they are immune to the action of strong boiling mineral acids, except hydrofluoric acid; whereas other non-acid resisting types may be stained even by water. Porcelain enamels can be formulated to resist most chemicals including those encountered in the food, chemical, pulp, paper and dye industries.

With respect to alkalies, porcelain enamels are only reasonably resistant. Free caustic will attack porcelain. Consequently, porcelain should not be used under conditions of long exposure to alkaline solutions. On the other hand, most porcelain enamels are sufficiently alkali resistant to be used for hot water heaters, laundry tubs and the like. In general, their resistance to chemical attack closely parallels their resistance to weathering; that is, acid-resistant types will have greater resistance to weathering than the non-acid-resisting types. The former are unaffected by industrial atmosphere, ultra-violet light and extreme temperature changes as well.

Although the softening temperatures of most porcelain enamels is just below the firing temperatures, the actual service temperature is limited and maximums range from about 600° to 1000° F. For special service, high-temperature enamels are known which can withstand short periods of 1700° F. Surprisingly, the thermal shock resistance is unusually good. Most types will withstand rapid changes in temperatures of at least 200° F. without damage. Some enamels may be heated as high as 350° F, dipped in ice water, and the process repeated a number of times without damage.

As may be expected, the thickness of the porcelain enamel coating has a decided influence on the appearance and physical properties of the final finish. Whereas until a few years ago coating thicknesses ranging from 15 to 20 mils were utilized, the trend today is toward thinner coatings and with the titanium dioxide enamels, 7 to 9 mils is not uncommon.

Because porcelain is essentially a form of glass, it is hard and dense, with a hardness of approximately 4 to 6 on the Moh scale. This compares to hardnesses of about 2 to 3 for the best of the organic finishes. This extreme hardness contributes greatly to the good abrasion and scratch-resistance of porcelain. Another property is the exceptional smoothness, which means low friction characteristics. The combination of these properties results in an abrasion-resistant coating ideal for material-handling and conveying equipment. Some of the abrasion resistant enamels are so hard that they resist scratching even by tool steel.

Chipping of porcelain refers to failure in which a piece or pieces of the enamel separate from the base metal. The tendency to chip from impact, tension, twisting, bending or deflection, is porcelain's only undesirable property, which is underscored, nevertheless, by the fact that chipped areas cannot be repaired satisfactorily.

Of course, this susceptibility to chipping upon improper handling is not as great a disadvantage as many paint people would like to think. Recent advances in enamel formulation, product design, coating thickness and adherence qualities have all helped to minimize the hazard. Although a sharp bend will still cause chipping, enamel sheets can now be flexed through a rather considerable curvature.

The introduction of titanium dioxide into frit formulations is responsible for the partial elimination of chipping and represents the most significant recent advance in the art of porcelain enameling. Indeed, titanium dioxide opacified frits in only five years time have managed to dominate the porcelain enamel industry, assuming a role of similar importance to that of titanium dioxide in the paint industry. The presence of titanium dioxide opacified frits in the enamel causes high opacity at low application weights as well as excellent acid resistance. Reduced film thickness promotes better adhesion and greater elasticity, which means a reduced tendency to chip. This is as true of porcelain enamel coatings as it is of organic films.

Some Applications

In general, titanium dioxide modified porcelain enamels are produced by incorporating a considerable amount of pure titanium dioxide with the other raw materials used in the manufacture of frit. Upon melting, the titanium dioxide is completely dissolved resulting in a frit of clear glass. When a porcelain enamel slip containing this frit is applied and fired, the dissolved titanium dioxide crystallizes out into minute particles. The index of refraction of these particles is higher than the glass in which they are dispersed. It is this ability to scatter light which gives an enamel its high reflectance and hiding power, the increase of which has, in turn, made possible a significant reduction in the required thickness of the film.

A large portion of the porcelain enamel industry uses only titanium dioxide opacified enamels for white porcelain-finish applications. Their uses for example, include stoves, refrigerators, lamp reflectors, hollow ware and signs. They have found the greatest acceptance in applications where high opacity and high acid resistance can be used to advantage.

Porcelain enamels are finding increased use as industrial finishes. Their resistance to chemical attack, abrasion, elevated temperatures and thermal shock have proved valuable in a variety of applications. Because of the many different kinds of applications and the wide range of service requirements encountered, each job is specially formulated.

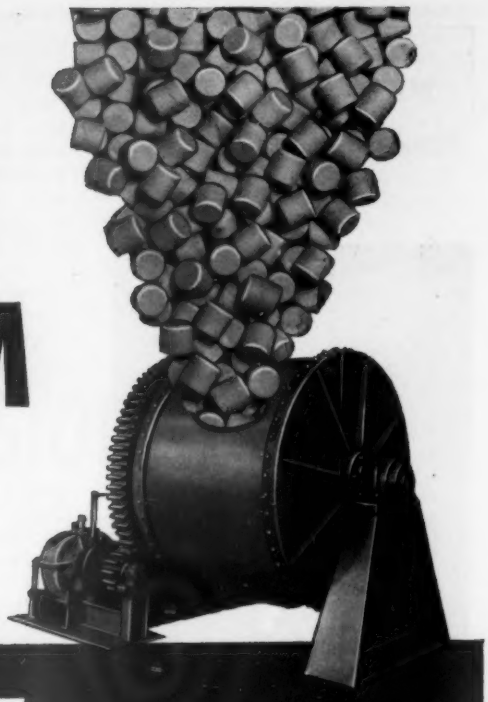
Probably the largest industrial use of porcelain enamels at present is for corrosion resistant linings for tanks, tank cars, vats, kettles, piping and other types of equipment in the chemical, food processing and pharmaceutical industries. Such equipment is referred to as "glass-lined."

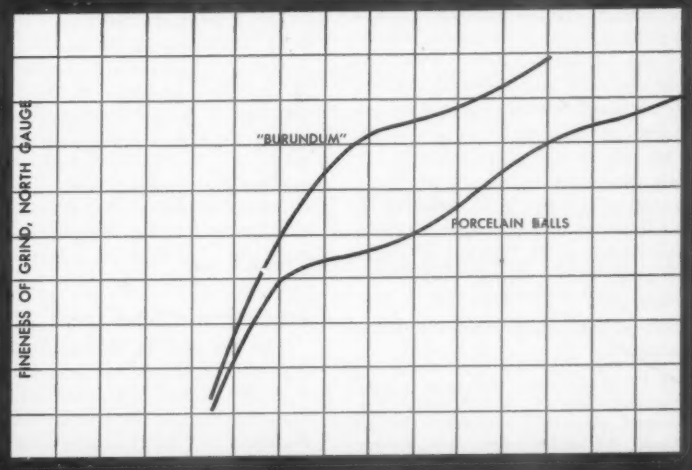
Another growing group of uses is for materials-handling. For example, porcelain enameled chutes, spouts and liners are now being used for handling such things as coal, coke, grains, concrete, cement and cinder. In the metal-producing field, porcelain enamel has found use as a protective coating for aluminum melting pots and for coating nitriding equipment. It has also been used for many years on wire-wound resistors and similar applications in the electrical industry.

(Turn to page 81)

Take the "long grind" out of paint making

USE BURUNDUM





ANOTHER CASE HISTORY

Field Report No. 81 [illegible] paint manufacturer [illegible] lusterless whites [illegible] equivalent size mill [illegible] were charges of Ber[illegible] 3/16" and [illegible] No. Volume of the [illegible] medium was 40% of the [illegible] the medium plus [illegible] charge was 65% of the [illegible] obtained are shown [illegible] the much faster, [illegible] obtained with Burundum.

Making some paints is just one continual grind — one long, drawn-out effort to get exact fineness you need. But, you can slash those grinding times — almost double the production of your mills with Burundum.

Burundum is the cylindrical grinding medium—the hard, high gravity medium that's been thoroughly proved in the production of finer, faster grinds.

Burundum's exclusive cylindrical shape gives the maximum area of attrition — the greatest work per contact. Burundum's high specific gravity gives faster action, higher permissible mill speeds — more contacts per minute. Burundum's extreme hardness gives longer wear, positive grinding — more efficiency per contact.

What's more, Burundum is smooth and non-porous for easy cleaning — white and slow wearing for minimum contamination.

So why not shorten your daily grind — why not look into Burundum, today?

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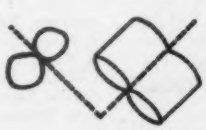
AKRON 9, OHIO
PROCESS EQUIPMENT DIVISION



Burundum's tubular shape means greater grinding contact area. No matter how the media falls, contact area is greater than the pin-point contact characteristic of spherical media.

14-D

John A. Scott

Sinclair Chemicals Formed

To expand its operations further in the field of petrochemicals, Sinclair Oil Corporation announced recently the formation of Sinclair Chemicals, Inc. as a direct subsidiary of the parent company.

The new organization will take over the production and sales of chemicals recoverable from petroleum raw materials heretofore handled by the Petrochemical Division of Sinclair Refining Company. Through this department, the Sinclair organization has been actively promoting hydrocarbons, special solvents, chemical polymers, petroleum sulfonates, and also several chemical by-products of the refining process.

The new subsidiary, of which Mr. Spencer also will be president, will utilize the research facilities of Sinclair Research Laboratories, Inc., but will also have its own research staff and market development department. John A. Scott, manager of the petrochemical division since its inception, will be executive vice president of the new company. E. W. Isom, Chairman of the Board of Sinclair Research Laboratories, Inc., and director of Sinclair research for more than 35 years, will be chairman. Headquarters of the new company will be in the Sinclair Oil Building, 600 Fifth Avenue, New York.

All Space at Coming Paint Show Sold

All exhibit space in the Federation of Paint and Varnish Production Clubs' 1952 Paint Industries' Show has been reserved and assigned, according to Gene Ott, chairman of the Paint Industries' Show Committee. The demand for space greatly exceeded the capacity of the Palmer House Exhibit Hall and efforts of the Show Committee to secure additional room in the Chicago hotel were unsuccessful.

The Show will open on Tuesday, November 18, at 2 P.M., and will close on Saturday, November 22, at 3 P.M. Daily exhibit hours will be from 9 A.M. to 6 P.M.

The early opening of the Show this year will give the members of the National Paint, Varnish and Lacquer Association, who will be attending their Annual Convention, an opportunity to view the Show. The Association's convention precedes the Federation's Annual Meeting which is scheduled for November 20, 21, and 22.

The Federation will have its display at the entrance to the Exhibit Hall and among the features of its exhibit will be the Color Aptitude Test. Provision will be made for administering the test under ideal conditions.

The Paint Industries' Show consists of: Mr. Ott (Cleveland Club); R. O. Adams (Southern Club); N. P. Beckwith (Detroit Club); T. F. Byron (Chicago Club); H. A. McConaghie (Philadelphia Club); G. H. Wescott (Philadelphia Club); and C. Homer Flynn, show manager.

Those who have been assigned exhibit space are:

Paul O. Abbe, Inc., Advance Solvents & Chemical Corp., C. M. Ambrose Co., American Cyanamid Co., Anderson Prichard Oil Corp., Ansbacher Siegle Corp., Archer-Daniels-Midland Co., Atlas Electric Devices Co., Bakelite Division, Baker Castor Oil Co., Bennett Industries, Inc., Binney & Smith Co., Bowser, Inc., Burt Machine Co., Carbide & Carbon Chemicals Co., Chisholm Ryder Co. of Penna., Cuno Engineering Corp., J. H. Day Co., Inc., Diamond Alkali Co., Dow Chemical Co., Edgar Brothers Co., Epworth Manufacturing Co., Falk & Co., Ferro Chemical Corp., General Electric Co., Goodyear Tire & Rubber Co., Harshaw Chemical Co., Hercules Filter Corp., Hercules Powder Co., Herman Hockmeyer & Co., Inland Steel Container Co., Spencer Kellogg & Sons, Inc., Kent Machine Works, Kinetic Dispersion Corp., Krumbhaar Chemicals, Inc., Lacquer Cooperative, Lead Industries Association, J. M. Lehmann Co., Inc., Metals Disintegrating Co., Inc., Mineral Pigments Corp., Moisture Register Co., Morehouse Industries, Naftone, Inc., Neville Co., Nuodex Products Co., Inc., Plaskon Division, L-O-F Glass Co., R-B-H- Dispersions, Reichhold Chemicals, Inc., Rohm & Haas Co., Charles Ross & Son Co., Ross & Rowe, Inc., Shell Chemical Corp., Shell Oil Co., Sparkler Manufacturing Co., Tennessee Eastman Co., Arthur C. Trask Co., Troy Engine & Machine Co., U.S. Industrial Chemicals Co., U.S. Stoneware Co., Union Bag & Paper Corp., Upressit Products Corp., T. F. Washburn Co., C. K. Williams & Co., Witco Chemical Co.

•

Officers for 1953 Gordon Conference on Coatings

Dr. L. H. Hoag of American Can Company was elected Vice-Chairman of the Gordon Research Conference on Organic Coatings at the meeting held June 17-20 at New Hampton, N.H. Dr. Hoag replaces Dr. Henry Grinsfelder of Rohm and Haas who succeeds the present Chairman, Dr. Richard W. Quarles of the Bakelite Fellowship, Mellon Institute. The following were selected to assist the officers in preparing the program for a meeting to be held in July, 1953.

Dr. Roy H. Kienle, American Cyanamid Co.
George H. Seagren, Mellon Institute
Robert J. Phair, Bell Laboratories
Wardley H. McMaster, General Motors Corp.
Frank W. Reinhart, National Bureau of Standards

The Conference held an interesting week of discussions, led by Dr. Quarles, designed to stimulate discussion on fundamental problems of the coatings industry. The Conference opened with a more or less formal talk designed to point out the unsolved problems in a manner to invite discussion. The group is limited in size so that everyone present can enter the discussion and all points of view may be fully presented.

•

Witco Names Sales Agent

The Kenneth H. White Company of Detroit, Michigan, has been appointed agent for Witco Napthenate, Tallate and Octoate driers in the Detroit area. The Kenneth H. White Company was formed seven years ago and has since become a leading supplier of chemicals to the paint and allied industries. Mr. White formerly worked with General Motors and the White Star Refining Company as a chemist before forming his own firm.

•

Rinshed-Mason Purchases Canadian Firm

The Rinshed-Mason Company of Detroit has purchased the Standard Paint and Varnish Company, Ltd., of Windsor. The Canadian firm will retain its name and will be headed by Frederick G. Weed, president; Joseph H. Parsons, secretary; and George Moneith, treasurer. The directors are Frederick G. Weed, A. Louise Rinshed, Joseph H. Parsons, Joseph R. Mason and W. R. Barrett, all of Detroit, and J. Leslie Straith of Windsor.

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Better Latex Emulsion Paints

A.S.P. ALUMINUM SILICATE PIGMENTS

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Unusual Ease of Application: Professional and "do it yourself" painters love the complete ease of application (with either roller or brush) of Latex Paints formulated with EDGAR ASPs.

Desirable Flow: EDGAR ASPs in Latex Paints give an easy, even flow to the film without misses or streaks.

Smooth Level Finish. Latex Paints with EDGAR ASPs give that type of finish to jobs that bring both home owners and contractors back for more.

and for you:

Free From Water Soluble Salts: EDGAR ASP 400 contains no ionic impurities that lead to breakdown of latex emulsion systems.

Thoroughly Compatible: EDGAR ASP 400 is an inert that blends perfectly with both pigments and emulsion.

Reduces Dispersion Time: Because of its excellent wettability, EDGAR ASP 400 has an unusual ease of dispersion.

Proven Performance: EDGAR ASP 400 was the pioneer inert of its kind in latex emulsion formulations and is now the most widely accepted and used inert in the field.

Reduces Your Costs: In addition to adding valuable qualities to your latex emulsion paints, EDGAR ASP 400 provides the plus value of reduced costs through its own low price (1½ cents per lb. in carload lots, f.o.b. McIntyre, Ga.) and its ease of formulation.

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EDGAR ASP Products serve the paint industry in many other ways also. . . . A card or letter will bring you full information without obligation.

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⬡ File folder with up to date technical literature
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Howard Sholl

Tentative Program of Federation Meeting Announced by H. Scholl

The tentative program for the meetings session at the Thirtieth Annual Meeting of the Federation of Paint and Varnish Production Clubs, to be held at the Palmer House in Chicago, November 20, 21, 22, 1952, has just been completed by Howard Sholl, chairman of the Program Committee.

The opening session on Thursday will convene at 10:15 a.m. Program for the day will include the keynote address by Dr. J. S. Long; an address by the Honorable Joseph F. Battley, president of the National Paint, Varnish and Lacquer Association; a roundtable discussion on the red-hot topic "Latex Paints;" a technical paper by Dr. B. L. Harris, of Johns Hopkins University; the Educational Program which will include a complete report of the Educational Committee and a Student Session; and Club papers. It is planned to have a number of students from technical schools in the vicinity of Chicago present at the Educational Program and the special program arranged for them.

Friday's session will feature the Mattiello Lecture by John MacGregor; a color symposium; a roundtable discussion on "Corrosion;" the Research Program; and Club papers. The Annual Meeting of the Federation is also scheduled for Friday.

A roundtable discussion on "Pigment Dispersion;" the unique "Gimmicks and Gadgets" presentation and roundtable discussion; and Club papers will complete the Saturday program.

Mr. Sholl is very anxious to have the roundtable discussions begin with a bang and requests that pertinent questions be sent to him as soon as possible to assist the panels in preparing for the sessions. His address is 1809 Bayard St., Baltimore, Md.

William Kentner is equally anxious to hear from people having gimmicks or gadgets that they would like to present to the group at the "Gimmicks and Gadgets" session. Mr. Kentner also announced that the "Gimmicks and Gadgets" exhibit will be at the Federation booth from the beginning of the Paint Industries' Show on Tuesday until the roundtable discussion on Saturday.

A colorful, educational, and interesting program is assured.

•

Paint Industry Technical Advisory Committee Meets

At a recent meeting of representatives of the paint industry and of NPA, the confrees on supply and requirements of important materials used by the paint industry issued a review advising NPA on use of varied substitute paint components for critical materials.

After an NPA spokesman told the group that there is no possibility of colbalt becoming more plentiful, because of the demand for this metal in jet engine production, the industry members reported that manganese and other auxiliary leaded and calcium driers can be satisfactorily substituted for colbalt driers in certain paint formulations.

It was pointed out that tests have shown that colbalt is the only suitable drier for use in proprietary aluminum paints. In substituting manganese for colbalt, the report continued, specific drier formulations must be worked out for the type and quantity of pigment, oil, or resin used.

The NPA reported that lead, zinc, synthetic iron oxide, titanium dioxide, phthalic anhydride and napthenic acid are in good-to-ample supply; still short are selenium, molybdenum and tungsten, and castor oil; considerably short of requirements is para-phenyl-phenol, with a current million pound backlog of orders.

Some further points made at the meeting were that carbonate of lead can be used for certain specifications for outside primer paints and can be substituted for leaded inc in finishing coats for outside paints; satisfactory outside paints can be made by using lead carbonate or silicate in the undercoat and titanium and zinc in the lead-free finished cot; and that no pigment thus far tested has been found as effective as copper metal or curpous oxide as a marine paint.

Industry members scheduled to be at the meeting were:

Dr. James S. Long, Devoe & Reynolds Co., Louisville; Paul Whitford, Eagle-Pitcher Co., Cincinnati; William J. Helfrich, W.P. Fuller & Co., San Francisco; Charles Love, C.K. Williams & Co., Easton, Pa; Stanley C. Schofield, Jaegle Paint & Varnish Co., Philadelphia; Ralph H. Everett, Merkin Paint Co., New York; Donald Leever, Reichold Chemicals Co., Detroit; and George A. Tracy, Rinshed-Mason Co., Inc., Detroit.

•

Plant Maintenance 1953 Show Scheduled for Cleveland

The Plant Maintenance Show, attended each year by top executives of virtually every industry, has been scheduled for the Public Auditorium in Cleveland in 1953, it was announced by Clapp & Poliak, Inc., New York, which conducts the exposition. The dates are Jan. 19 to 22, inclusive.

The show, which developed from new management techniques in preventive maintenance, has risen in three years to one of the nation's foremost industrial expositions. Experts from all parts of the world attend.

The 1953 show will be almost 75 per cent larger than its 1952 counterpart. Exhibits will cover a gross area of 110,000 square feet. Compared to the first show in 1950, it will have almost four times as many exhibiting companies and cover about six times as much area. At least three companies, General Electric Co., Westinghouse Electric Corp. and Clark Equipment Co., each will have displays covering three thousand square feet. Three hundred and fifty other companies are expected to conduct exhibits.

•

American Can Opens Stockton Factory

The American Can Company's new, multi-million-dollar Stockton, Calif., plant was officially opened July 10 by civic and governmental leaders and can company executives from New York and the West Coast.

The plant, with a rated production capacity of 350,000,000 containers a year, was built to meet the growing needs of the vital fruit and vegetable packing industry of the Delta and San Joaquin Valley.

Among the guests participating in the plant opening were L. W. Grasskamp, vice president in the company's executive department; State Senator Verne W. Hoffman, C. W. Roberts, Canco's vice president in charge of the Pacific Division, and Mayors L. L. Ventre, Stockton; Carl N. Hansen, Manteca and Thurlow Haskell, Lodi.

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Dow Latex 762 W is the latest Dow improvement in latex for paints. Its uniform quality and ease of formulation enable paint manufacturers to maintain consistent, high-quality production. Dow Latex 762 W makes it easier to build freeze-thaw stability into your latex paint formulation. Its sensitivity to ionic contamination has been reduced, supplying extra protection against water hardness. This newest member of Dow's family of fine latexes has, additionally, all the excellent properties and characteristics typical of Dow latexes.

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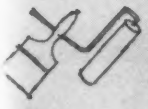

MAKES PAINT EASY TO APPLY

Dow latex makes paints easy to apply over many types of surfaces. Latex-based paints go on walls smoothly, whether brush or roller is used. Stop or start any time, you won't find lap or brush marks.

DOW LATEX ALSO MAKES PAINT

DURABLE • BRUSHABLE • CLEANABLE • FAST DRYING

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Announcing...
two
new odorless
alkyd resins
—Syntex 71
and Syntex 141
JONES-DABNEY CO.
DIVISION OF DEVOE & RAYNOLDS CO., INC. · Louisville, Ky.—Newark, N. J.—Los Angeles, Calif.

Now—you can formulate architectural paints that are completely free of conventional paint odor! Especially made for use with Odorless Mineral Spirits, these new Alkyd Resins—Syntex 71 and Syntex 141—are odor-free when applied, odor-free while drying.

You can simplify production because you only need two resins. With combinations of Syntex 71 (for gloss formulations) and Syntex 141 (for flats) you can make your entire line of interior coatings completely free of conventional paint odor. These include semi-gloss, primer-sealers, undercoaters, deep tone flats, floor paints and four-hour enamels. What's more, suggested formulations for all these products are available.

Paint quality improves, too. Syntex 71 and Syntex 141 give your line better color uniformity on dissimilar surfaces, longer wet edge time, wider range of compatibility with other resins, plus all the advantages that are realized from the use of alkyd resins in protective coatings.

Thoroughly tested in actual usage, these new resins met with instant approval. Full production quantities are available today.

PHYSICAL CONSTANTS

	Syntex 71 (for gloss)	Syntex 141 (for flat)
Viscosity	Z_4 - Z_6	Z_4 - Z_6+
Wt/Gallon	7.45 - 7.55	7.15 - 7.25
Solids	60%	40%
Acid Value	4 - 7	15 - 25
Color	7 Maximum	10 Maximum
Solvent	Odorless Mineral Spirits	Odorless Mineral Spirits
Red. Viscosity	T - V 50% Solids in Odorless Mineral Spirits	F - I 25% Solids in Odorless Mineral Spirits

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Federation Plans Interesting Program at Chicago Meeting

No animal acts, no acrobats, no jugglers. That is the promise of the Program Committee of the Federation of Paint & Varnish Production Clubs for the Annual Meeting which will be held at the Palmer House in Chicago, November 20, 21 and 22. The program is practically complete and promises a nice balance between technical and production papers, roundtable discussions and educational and research presentations.

Featured, of course, will be the Mattiello Lecture presented this year by one of the Federation's founders — John MacGregor and the keynote speaker will be Dr. S. Long of Devoe & Raynolds who is a scientist and an educator in our industry. There will be three red-hot roundtable discussions covering Latex Paints, Corrosion, and Dispersion Equipment. And an added feature "Gadgets and Gimmicks". This is a steal from the Pacific Coast meeting held earlier this year. Every laboratory and plant has one or more simple pieces of equipment, rigged up within the organization, that does some complicated job quickly and easily. Maybe not scientifically but sufficiently reliable to be most useful. There will be a display of these "Gadgets and Gimmicks" at the Federation booth and a session on the program for describing and discussing these tools of the trade.

Members of the Program Committee are: Howard Sholl (Baltimore Club) Chairman; F. L. Couch, (Dallas Club); H. E. Hillman, New York Club; H. Kelfer, (New England Club); W. C. Kentner, (CDIC Club); L. Ludwig, (Chicago Club) and M. Van Loo, (Chicago Club).

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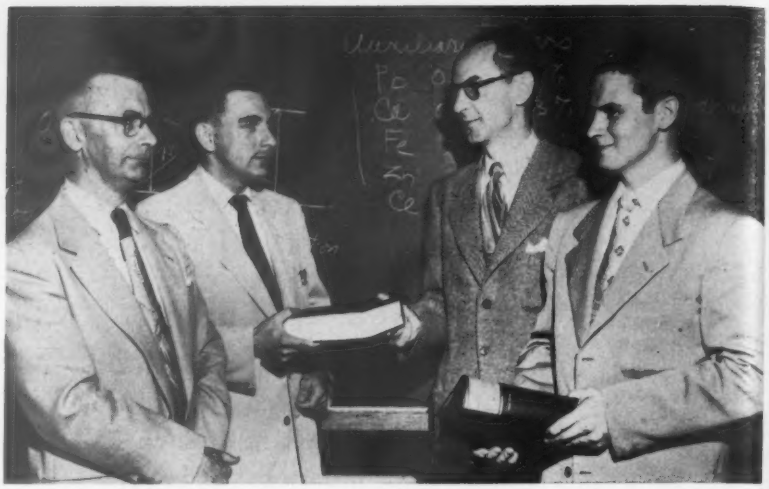
Noted Paint Technologist Given Professorship at Louisville

Dr. J. S. Long, a world authority on paint technology, has been appointed professor at the University of Louisville's Speed Scientific School, it was announced by R. C. Enrst, Dean of the school.

Dr. Long is chemical director of Devoe & Raynolds Company, Inc., and has been lecturing on paint and varnish technology at the school for a number of years.

His new duties will include the development and supervision of a more extensive graduate program in the field of paint technology.



Nuodex Award Presentation at No. Dak. Agricultural College.

William Gort of the Nuodex Company presents the annual Nuodex award to R. Peffer and M. Danforth for their excellent academic record in paint technology courses. The award consists of a set of Mattiello's works on "Protective and Decorative Coatings." Left to right: Dr. Wouter Bosch, Department Head of Paint Technology; Wm. Gort, R. Peffer and M. Danforth, students.

Mellon Institute Announces New Bakelite Multiple Fellowship

Dr. E. R. Weidlein, President, Mellon Institute, Pittsburgh Pa., announces the establishment of a new Multiple Fellowship to develop uses for resins derived from ethylene and acetylene. The Fellowship, sponsored by the Bakelite Company, a division of Union Carbide and Carbon Corporation, New York, N. Y., will be headed by Dr. Richard W. Quarles, Senior Fellow. His associates will be William H. McKnight, Dr. Edward T. Severs, Walter K. Vollmer, Arthur C. Frechtling, John T. Ingram and Gordon P. Bigelow.

This group has heretofore been a part of the Multiple Fellowship on Organic Synthesis sustained by the Carbide and Carbon Corporation. The specialists of the group have been engaged in the study of "Vinylite" resins, originally developed at Mellon Institute by the parent Fellowship. Dr. Quarles and his co-workers have numerous patents and scientific papers on these resins and their uses in surface coatings, adhesives, wash primers, organosols and plastisols. Their recent development of plastigels has attracted considerable interest in that it provides a method of molding vinyl plastics with inexpensive equipment.

Dr. Quarles is a well known authority on vinyl plastics having been active in the field for fifteen years. He holds a B.S. in chemical engineering and a Ph.D. in chemistry from the University of Virginia. After two years of post-doctorate research in chemistry and physics at the Universities of Virginia and Michigan he joined the research department of the Carbide and Carbon Chemicals Company in 1937. He was transferred to the Organic Synthesis Fellowship in 1939. Mr. McKnight also joined the Carbide and Carbon Chemicals research department in 1937, coming to the Mellon Institute Fellowship in 1945. He is a graduate of Morris Harvey College with a B.S. degree. Mr. Vollmer, who has a B.S. degree from the University of Pittsburgh, has been at Mellon Institute since 1944, following a number of years in paint and resin laboratories. Dr. Severs received his B.S. and M.S. degrees from the University of Pennsylvania and his Ph.D. degree from the University of Delaware. After several years experience in plastics and coatings he was added to the group in 1949. Mr. Frechtling had his training at Wooster College and the University of Pittsburgh, holding a B.S. degree from the former. He has been a member of Mellon Institute since 1942. Three other chemists will soon join the group.

•

Atlas Powder Opens Southwest Office

George J. King, director of sales of the Industrial Chemicals Department has announced the opening of a new office in the Southwest to provide additional service for users of Atlas chemicals.

Allen V. Riley, Jr. had been assigned as technical sales representative in this office which will be located in River Oaks Bldg., 3272 Westheimer Road, Houston, Texas.

Tennessee Eastman Dedicates New Sales Service Laboratory

Tennessee Eastman Company recently dedicated its new sales service laboratory building Kingsport, Tenn. at an open house held for the Northeast Tennessee Section of the American Chemical Society.

Over 100 chemists and engineers visited the laboratories, examined the various equipment and discussed the work currently being carried on with Tennessee Eastman's staff of chemists and technicians.

The laboratory building itself covers some 16,840 square feet and is divided into four major sections.

The work of the protective coatings laboratory is primarily devoted to problems relating to solvents, plasticizers, cellulose esters and such miscellaneous chemicals as stabilizers, ultraviolet inhibitors and antiskinning agents. This section is equipped to prepare formulations, make test panels, strips and films and evaluate such samples under a wide variety of conditions. Typical products tested include strip coatings; hot and cold dipping lacquers; hot melt coatings; and cellulose ester lacquers for fabrics, wire, wire screen, wood and metal.

The facilities and staff of the physical testing section are available to both the protective coatings and the plastics laboratory. Generally the equipment and methods used are in accordance with ASTM standards. When unique problems arise which are not adequately covered by the ASTM, however, the staff develop and set up special tests and standards which meet the peculiar requirements of such problems.

The physical testing laboratory is equipped to make such tests as elongation (D 882-49T), tensile strength (D 882-49T), tear resistance (D 1004-49T), brittle point (modified D 746-44T), torsion (Clash-Berg Method), accelerated weathering (D 795-49), chemical resistance (D 543-43), loss in weight on heating, Durometer hardness, penetration value, flash and fire points and humidity tests.

Views at new Tennessee Eastman sales service laboratories

Top: ACS visitors to the Tennessee Eastman service laboratories open house found the work being carried on in the protective coating laboratory on butyrate strip coating of interest. Center: The protective coating section is equipped to analyze problems arising out of the use of Eastman cellulose esters, solvents, plasticizers, and stabilizers. Here a technician prepares a test panel of a new lacquer formulation. Bottom: An external view of Tennessee Eastman's new lab at Kingsport, Tenn.

E. F. Kelchner of Devoe & Raynolds Succumbs

Edward F. Kelchner, former Eastern District Manager of General Trade Sales for Devoe & Raynolds Company, Inc., died recently at his home at 673 King Avenue, City Island, New York City.

A Devoe veteran of 41 years, Mr. Kelchner had retired from active business on June 30, 1950 as their Eastern District Manager, which position he had held since August 1, 1948. Previously, he had been Devoe's New York Branch Manager for 21 years after serving two years as Metropolitan District Manager to which position he was appointed in 1925. Mr. Kelchner started with Devoe October 1909. He was born in New York City, May 20, 1886.

New ASTM Officers

Dr. Harold Lee Maxwell, supervisor of mechanical engineering consultants, E. I. du Pont de Nemours & Co., Inc., Wilmington, Del., was elected president for 1952-1953, succeeding T. S. Fuller, engineer in charge of works laboratory, General Electric Company, Schenectady, N. Y., who continues on the board of directors as past-president for three years.

Norman L. Mochel, manager, metallurgical engineering, Westinghouse Electric Corporation, Lester Branch P.O., Philadelphia 13, Pa., is the new vice-president.

The new members of the board of directors are as follows: George R. Gohn, supervisor, creep and fatigue laboratories, Bell Telephone Laboratories, 463 West Street, New York, N. Y.; William H. Lutz, technical director, Pratt & Lambert, Inc., 75 Tonawanda Street, Buffalo, N. Y.; Howard K. Nason, research director, organic chemicals division, Monsanto Chemical Company, St. Louis, Mo.; Adolph O. Schaefer, vice-president in charge of engineering and manufacturing, The Midvale Company, Nicetown, Philadelphia 40, Pa.; and Myron A. Swayze, director of research, Lone Star Cement Corporation, 100 Park Avenue, New York, N. Y.

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Superior Materials Establishes Warehouse in Boston, Mass.

M. W. Budman, sales manager of Superior Materials, Inc., 120 Liberty Street, New York City, announced that they have established warehouse stocks in Boston in order to supply the growing demand for A.S.P. pigments in the New England area. This is in addition to stocks Superior Materials, Inc. has previously set up in New York City and Philadelphia.

The A.S.P. pigments are specially processed aluminum silicates and are manufactured by Edgar Brothers Company for whom Superior Materials, Inc. is the exclusive distributor in the New England and Middle Atlantic areas.

•

Morehouse Starts Expansion

Preliminary excavating and foundation work was recently started for plant expansion by Morehouse Industries of Los Angeles, manufacturers of high speed stone mills for food and chemical processing. A new building adjacent to the present headquarters plant and office building will comprise approximately 10,000 square feet. The additional plant facilities, which will house the laboratory and machine shop, will greatly increase research facilities and will help to speed up customer research, it was anticipated, while plant capacity will be doubled.

Paint Courses at N. Dakota Agricultural Well Attended

The Department of Paints and Varnishes of North Dakota Agricultural College at Fargo has reported that the recent paint short courses have been the biggest ever conducted by the department. Twenty-six were enrolled in the Fifth Paint Short Course for Beginners and 30 men from industry took the Second Advanced Paint Refresher Course. In the latter course nine guest lecturers provided the students with the latest developments in various phases of paint technology.

Those who attended the Fifth Paint Short Course for Beginners are shown in the upper photograph in adjoining column, with a listing of their names and affiliations.

The Second Advanced Paint Refresher Course was attended by the following shown in the lower photograph with a listing of their names and affiliations.

•

Venezuelan Paint Company Builds New Factory In Caracas

The large scale building boom going on in Venezuela, and particularly in Caracas, the capital city, was the impetus for the erection of the Tucan paint factory in Caracas by the G. & H. Zingg Company according to a recent company report.

The new plant, designed by Dr. J. Rinse, of Bernardsville, N.J. and Mr. W. Dorst, of Holland, will remedy the inadequate paint production problem of the country. Imports and a few local paint factories were the previous source of paint products, the report said.

Construction of a modern varnish factory to accompany the new paint plant is now being planned. It is hoped the report said, that local mineral resources can supply the materials needed in pigments and extenders. However, for the present, the majority of pigments, drying oils and resins have to be imported.

Mr. H. Zingg, acting-director of the new factory, and a staff of paint technicians and chemists have already begun production of several modern paints, including latex and alkyd paints the report concluded.

Participants in Short and Advanced Paint Courses at North Dakota Agricultural College

1st. row l. to r. Aldo Trameri, Mautz Paint and Var. Co., Madison, Wisc.; Alvin W. Kloss, Holrite Paints, Inc., Baton Rouge, La.; Edward G. Kaberna, Commerce Petroleum Co., Chicago, Ill.; Kenneth L. Kelley, Pan-American Wall Paper and Paint Co., Evanston, Ill.; William D. Wurdack, Walter Wurdack, Inc., Clayton, Mo.; Robert A. Zimmerman, Phelan-Faust Paint Mfg. Co., St. Louis, Mo.; Dr. Wouter Bosch, N.D.A.C.; William Jacoby, N.D.A.C. Assistant; Maurice C. Miller, Minnesota Paint Inc., Fort Wayne, Ind.;

2nd. row l. to r.: Mrs. Watson; Mrs. Miller; Mrs. Fowler; Mrs. Bosch; Dean R. E. Dunbar, N.D. A.C.; Mrs. Dunbar; Mrs. Marcus; Mrs. Vogel; Mrs. Amacker;

3rd. row l. to r.: Henry K. Watson, Watson Stand. Co., Pittsburgh, Pa.; Harry J. Scheifele, Jr., Rohm and Haas Co., Marion, Pa.; Peter Heck, Alkydol Laboratories, Inc., Broadview, Ill.; Ashton E. Garner, Calcium Products Div., The Georgia Marble Co., Tate, Georgia; Richard B. Allen, Industrial Oil and Varnish Co., Crete, Ill.; Calvin H. Marcus, Jr., Edw. H. Marcus Paint Co., Louisville, Kentucky; Franklin Vogel, Vogel Paint and Wax Co., Orange City, Iowa; Melvin G. Amacker, Gulf States Paint Co., Houston, Texas; Roy M. Fowler, Allied Paint Mfg. Co., Tulsa, Oklahoma.

4th. row l. to r.: Ralph D. Graves, American Paint Mfg. Co., Birmingham, Ala.; John E. Ormsby, Consumers Cooperative Assn., Kansas City, Missouri; Robert B. Green, Ace Paint Products, Chicago, Ill.; John R. Grosser, The Perry and Derrick Co. Inc., Bellevue, Ky.; Norman D. Cota, Jr., Patek Brothers Inc., Milwaukee, Wisc.; Kenneth Braa, Zehrun and Chemical Co., Seattle, Wash.; Herbert Roy Hicks, Burks-Hallman Co., Memphis, Tenn.; Anthony T. Imhof, Morris Paint and Varnish Co., Omaha, Nebr.; Guy de Brun, Egyptian Lacquer Mfg. Co., Lafayette, Ind.; Anton Schweiger, Morris Paint and Var. Co., Omaha, Nebr.

1st. row l. to r.: Roland Peffer, Paint graduate, N.D.A.C.; Dr. Lee B. Storms, Red Spot Paint and Varnish Co., Evansville 14, Ind.; Arthur A. Gareau, Mt. Royal Color and Varnish, Montreal 8 P.Q. Canada; William Gort, Guest lecturer, Nuodex; Dr. Wouter Bosch, N.D.A.C.; William Jacoby, N.D.A.C. Assistant; Mervin Danforth, N.D.A.C. Assistant; Otis R. Videen, Wood Conversion Co., Cloquet, Minnesota; Francis J. Herber, Minnesota Paints Inc., Ft. Wayne, Inc.;

2nd. row l. to r.: John F. Reidy, Corps of Engineers, U.S. Army, Davenport, Iowa; Hudsan Jr.; Mrs. Hudson; Mrs. Johnson; Johnson Jr.; Mrs. Wilson; Mrs. Stella McMillian, Housemother N.D.A.C. Dakota Hall; Mrs. Danforth; Mrs. Bosch; Bert Wilson, Andrew Brown Co., Irving, Texas;

3rd. row l. to r.: Carl H. Senter, Skelly Oil Co., Ottawa, Kansas; Dr. Charles W. Hughes, Skelly Oil Co., Chicago, Ill.; Carlton R. Hanks, Badger Paint Stores, Milwaukee 11, Wisc.; J. W. Watson, Archer-Daniels-Midland Co., Minneapolis, Minn.; Fred W. Morgart, Jr., Skelly Oil Co., St. Paul 5, Minn.; Stanley Saxton, Rudd Paint and Varnish Co., Seattle 99, Wash.; Louis Hudson, Reifschneider Paint and Glass Co., Omaha, Nebr.; H. N. Miller, Continental Carbon Co., Amarillo, Texas.; John Thornberry, Ransburg Electro-Coating Corp., Indianapolis 5, Ind.; Walter Groves, Price Varnish Co., Kirkwood, Mo.; Stewart S. Comba, Consolidated Mining and Smelting Co. of Canada Ltd., Rossland, B.C., Canada;

4th row l. to r.: Paul D. Patrick Jr., West Virginia Pulp and Paper Co., Charleston 34, S.C.; Raymond Tooke, Jr., Georgia Institute of Technology, Atlanta, Georgia.; Charles E. Wilsterman, Deer-O Paints and Chemicals, Ltd., Phoenix, Arizona; Bernard F. Ryer, Decatur Chemical Co., Atlanta, Ga.; Murray Kornbluth, Dept. of the Army Engineer Research and Dev. Laboratories, Ft. Belvoir, Va.; R. Dwight Weed, Durako Paint and Color Corp., Detroit 34, Michigan; William F. Smith, Vanguard Paints and Finishes, Inc., Marietta, Ohio; H. Alan Reinshagen, Hooker Glass and Paint Co., Chicago, Ill.; Edwin W. Jones, Red Spot Paint and Varnish Co., Evansville, Ind.; John S. Hooper, Roxalin of Canada Ltd., New Toronto, Ontario, Canada.; Jarvis M. Johnson, Cabot Carbon Co., Pampa, Texas; J. M. Brandt, Geo. C. Brandt, Inc., Kansas City, Kansas.

Koppers New West Coast Plant Starts Production

First production of tar-base enamel pipe-line coatings and roofing pitches in a plant built west of the Rocky Mountains began on July 15.

This was announced recently in Pittsburgh, Pa., headquarters of Koppers Company, Inc., which is constructing a tar products plant adjacent to Kaiser Steel Company property. The plant will process tar received under contract from Kaiser's coke ovens.

In charge of operations at the new Fontana plant will be G. E. Traut, who has been superintendent of a group of four Koppers Tar Products plants in the vicinity of Everett, Mass. Mr. Traut, a graduate of the University of Illinois in chemical engineering, started work with Koppers as a cadet engineer in 1928. He became a plant superintendent in 1931 and has been superintendent of the Everett group of plants since 1948.

T. A. McGivern will be in charge of the enamel and roofing plant, reporting to Mr. Traut. He was formerly superintendent of Koppers Tar Plant at Hamilton, Ohio.

When the plant is in complete operation it will employ about 75 persons.

Products of the plant will be sold through the Los Angeles sales office of Koppers Tar Products Division which is headed by S. J. Katz. Mr. Katz is the Division's Pacific District Sales Manager. A native of St. Louis, Mo., he joined Koppers in 1921 as a chemist, later entering sales work. Before coming to California in 1949, he was assistant manager of the Division's Midwest district, with offices in Chicago.

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Buten Stores Purchase Six Acre Site For New Quarters

A $500,000 office building providing 60,000 square feet of space, warehouse, and store will be erected by the Buten Paint Stores on their newly purchased six acre site at 5000 Ridge Avenue, just west on Wissahicken, Philadelphia, according to a company report recently.

The new location will serve as general headquarters when it is completed sometime next spring. The only portion of the firm's present quarters at 1834 South street, that will remain in use is the retail store on South street..

The Murray Realty Company representing the Buten Stores, purchased the land from the Penn Fruit Company.

How to put greater
PROTECT-ABILITY
in your
Metal Protective Paints
Your customers demand the greatest protect-ability in paints they use for protecting bridges, railway signals, water towers, fire escapes, other steel structures and equipment including metal furniture. Give it to them!
Two Pure Black Iron Oxides
Try formulating with either of these two Pure Black Iron Oxides made by Williams for just this purpose. Both produce tough, non-porous, elastic films of unusually high protect-ability. Used in combination with either zinc chromate or red lead, they can be formulated to give metal protective paints of exceedingly long life.

For samples, ask your Williams representative or write us today for complete technical information. Address Dept. 23, C. K. Williams & Co., Easton, Pa.

Analysis of Williams Pure Black Iron Oxides B-247 and BK-250

$FeO + Fe_2O_3$	96.0% Min.
FeO	20.0% Min.
H_2O Soluble	0.5% Max.
Sp. G.	4.96
Fineness thru 325	99.5
pH Value	7-9
Avg. Diameter	0.4 microns

WILLIAMS
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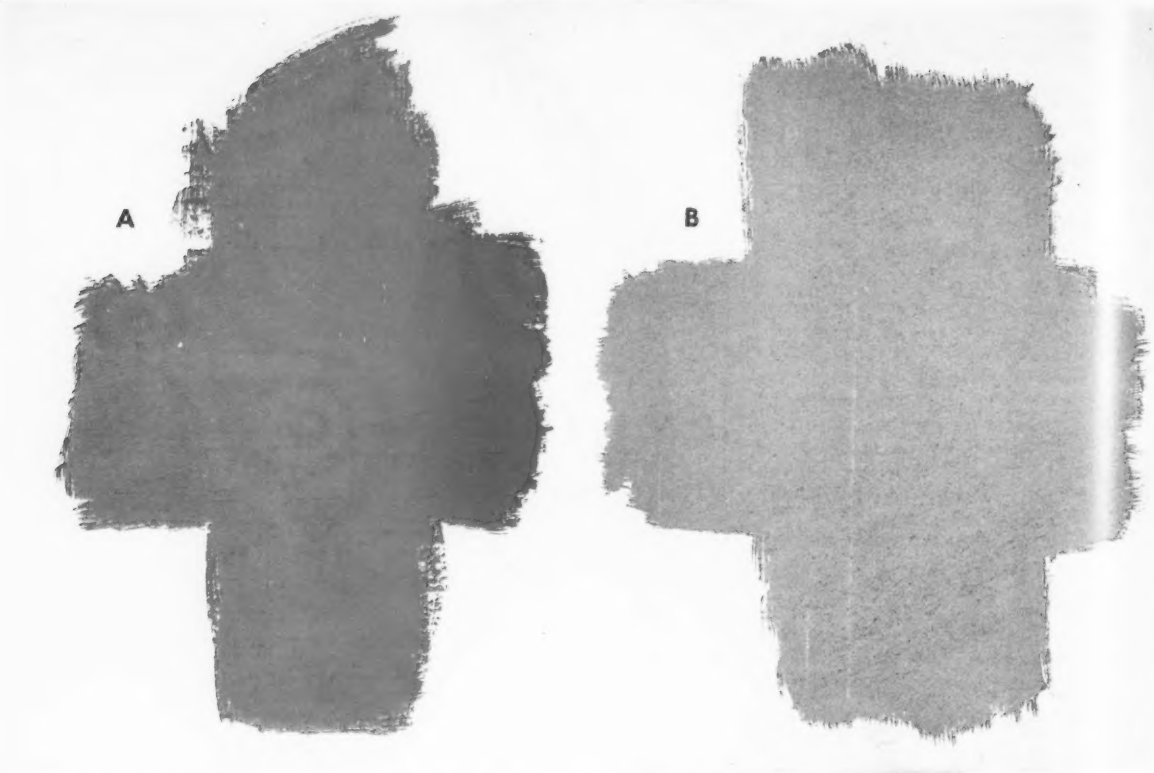
C. K. WILLIAMS & CO. • Easton, Pa. • East St. Louis, Ill. • Emeryville, Cal.

108 Shades & Types of Iron Oxide Pigments, Chromium Oxides & Hydrates

Photograph of front of sheet



Brush-out of one-coat flat enamel made from Cyanamid's new REZYL Resin 405-18.*

Brush-out of standard oil base one-coat flat enamel.

Which paint

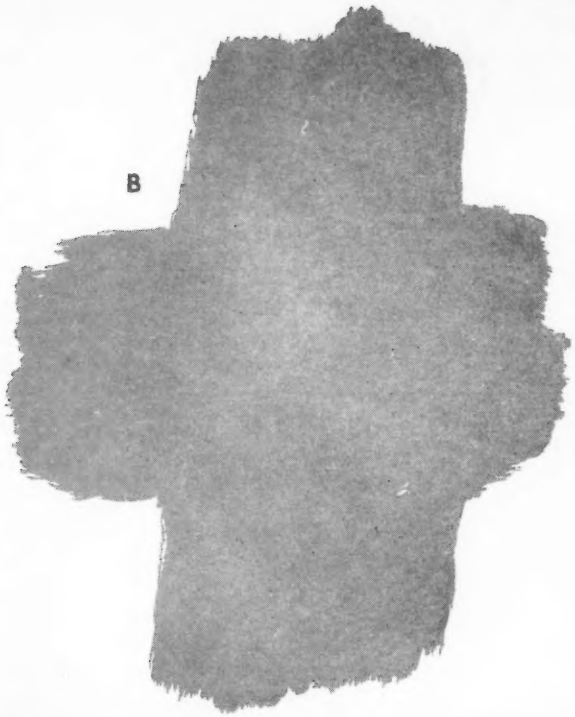
Announcing: A New Cyanamid Resin for

When properly pigmented, REZYL 405-18—an oil-modified alkyd resin—produces white, pastel and deep-tone colors with all these advantages:

Non-penetrating properties	Film uniformity
Easy brushing	Color retention
High scrub resistance	Fast dry

*Brush-outs of the two enamels were made on the sheet of paper at the same time.

Photograph of back of sheet



REZYL Resin 405-18 enamel did not penetrate the sheet of paper.

Note penetration of oil base enamel

did not penetrate?

Non-Penetrating Flat Finishes...REZYL® 405-18

Flat finishes made from REZYL 405-18 show *no differences* in color and gloss when applied to surfaces ranging in porosity from gloss enamel to wallpaper!

Write for technical data or samples.

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COATING RESINS DEPARTMENT

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ACS Paint And Plastics Div. Announces September Program

Monday Morning, Sept. 15, 1952-Symposium on the Literature of Synthetic Resins and Plastics.

Monday Afternoon, Sept. 15, 1952-General Papers On Paint And Varnish-R. Scofield, Presiding

Max Kronstein, Louis F. DeLong, and Alfred W. Norman-Methods for Comparative Evaluation of Paint Bonding Metal Phosphate Pretreatments on Steel
Alfred M. Malloy, Walter Soller, and Aaron G. Roberts-Evaluation of Adhesion of Organic Coatings by Ultracentrifugal and Other Methods
William M. Gearhart and Fred M. Ball-Formulation of Cellulose Acetate Butyrate Lacquers. I. Wood Finishes.
Peter P. Grad and Robert J. Dunn-Determination of the Mol Ratio of Urea to Formaldehyde in Their Condensation Products
S. Robbins and R. H. Runk-Oil Soluble Moderately Heat-Reactive Phenolic Resins

Tuesday Morning and Afternoon, Sept. 16, 1952-Symposium on Emulsion Polymers and Emulsion Paints, John K. Wise, Presiding

John K. Wise-Introductory Remarks
H. A. Scholz-History of Water Thinned Paints
Harold Naidus-Preparation of Emulsion Polymers For Paint Use
W. A. Henson, D.A. Taber, and E. B. Bradford-The Mechanism of Film Formation of Latex Paints
George L. Brown-Water Penetration of Emulsion Polymer Films
Russel B. Green-Behavior of Externally Plasticized Latices In Water Paints
Louis A. Melsheimer and Walter H. Hoback-Pigmentation of Latex Paints
Dean A. Bixler-Factors Related to Protein Usage Affecting Viscosity Stability of Latex Paints
E. K. Stilbert and I. J. Cummings-Synthetic Latex in Scrub-Resistant Intumescent Coatings
F. A. DiGioia and R. E. Nelson-Freeze-Thaw Studies on Some Polymers for Latex Paints

Wednesday Morning and Afternoon, Sept. 17, 1952-General Papers on Plastics—A.K. Doolittle, Presiding

W. L. Gore-Introductory Remarks to Series of Papers on Theory and Operation of Plastic Extruders
R. A. Strub and J. F. Carley-Survey of Basic Concepts on Extrusion
J. F. Carley and R. A. Struo-Application of Theory to Design of Extruders.
R. S. Mallouk and J. M. McKelvey, and J.F. Carley-A Simplified Flow Theory for Screw Extruders
R. S. Mallouk and J. M. McKelvey-Power Requirements for Melt Extruders
J. F. Carley and J. M. McKelvey-Extruder Scale-up Theory and Experiments
J. M. McKelvey-Experimental Studies of Melt Extrusion
C. H. Jepson-Future Extrusion Studies
E. E. Lewis and Charles M. Winchester-Rheology of Lubricated Polytetrafluoroethylene Compositions
F. P. Greenspan and Ralph J. Gall-Epoxy Fatty Acid Esters-A New Class of Vinyl Plasticizers
R. E. Burnett-Determination of Gel Times of Multifunctional Reactants

General Papers on Printing Inks-A. C. Zettlemoyer, Presiding

William C. Walker-The NPIRI Planetary Rubometer
Louis Maus, Jr., W. C. Walker, and A. C. Zettlemoyer-Dispersion Studies I. Correlation of Roll Mill Variables

Divisional Social Hour

Thursday Morning and Afternoon, Sept. 18, 1952-Symposium on Adhesives-C. F. Brown, Presiding

C. F. Brown-Introductory Remarks
J. R. Skeen and Margaret V. Donnelly-Market Survey of Adhesives
F. W. Reinhart-Theory of Adhesion
S. E. Urban-Solvent Type of Adhesives
A. B. Crowell-Solvent Retention of Adhesives
W. E. Lindquist, Robert D. MacDonald, and Hubert T. Tierney-Pressure Sensitive Adhesives
C. R. Peaker-Adhesives Based on Aqueous Dispersions of Elastomers
G. S. Casebold-Amino Resin Adhesives
R. E. Smith-Liquid Starch Adhesives
H. Grinsfelder, B. Coe, and R. P. Hopkins-Mechanical Testing of Structural Adhesives

Friday Morning and Afternoon, Sept. 19, 1952-Symposium on Resins in Textile Finishes, J. McE. Sanderson, Presiding

J. McE. Sanderson-Introductory Remarks
G. E. Ham, A. B. Craig, and Paul W. Gann-Preparation of Dyeable Fiber-Forming Compositions by the Reaction of Acrylonitrile-Alkenyl Chloroacetate Copolymers with Amines
A. C. Nuessle and B. B. Kine-Some Chemical and Physical Properties of Acrylics for Textile Processing
Ray Krammes and Charles Maresh-Identification of the Common Textile Finishes
Norman Van Gorber, Marshall Duke, and Fred Fortess-The Resin Finishing of Acetate Fabrics
L. P. Biefield and T. E. Philipps-Finishes For Class Fabrics for Reinforcing Polyester Plastics
A. Booth, J. Fine, E. N. Harvey, Jr., and Z. W. Wicks, Jr.-Resins in Textile Printing
H. C. Woodruff and G. S. Cook-Color Value as a Function of Penetration in Textile Pigment Prints
George F. Walter-Flameproofing Monomers and Polymers

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National Lead Company Acquires Titangesellschaft in Germany

National Lead Company announced recently that Titangesellschaft m.b.H. of Leverkusen, Germany, in which National Lead has had a fifty per cent interest, has been wholly acquired through purchase of the remianing capital stock from I. G. Farbenindustrie. Joseph A. Martino, president of National Lead Company, stated that the transaction was approved by the Allied Control Council. Negotiations commenced shortly after the end of World War II and were completed within the past few days. Titangesellschaft operates a plant in the British Zone in Leverkusen, Germany, producing titanium dioxide pigments for European consumption. The plant is the largest of its type in Europe. Sales will be handled through National Lead Company's subsidiaries in Norway, France, Belgium and the Netherlands.

Ilmenite ore for the plant, which is expected to have an output of pigment adequate to supply all the requirements of Western Europe, will come from National Lead Company's mine and plant in Norway. Steam, power, water, sulfuric acid and raw materials other than ilmenite, will be furnished under contract by Farbenfabriken Bayer.

Despite almost complete demolition by air raids during World War II, the plant has been repaired and new equipment installed to such an extent that output today is nearly three times that of pre-World War II capacity. Modern equipment has replaced the old, with efficiency thereby increased to a great extent.

The majority of titanium dioxide pigments produced at the Titangesellschaft m.b.H. plant will go to paint manufacturers, with lesser amounts going to the paper, rubber and ceramics industries. It is expected that the operation of the plant unit will be an important factor contributing to the rehabilitation of the European economy.

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AIA Producers' Council Lauds S-W Color Guide

The Jury of Awards for the 1952 Product Literature Competition sponsored by the American Institute of Architects and the Producers' Council, Inc. has singled out the Sherwin-Williams Style Guide Companion for honorable mention. This is the only paint company entry to be so honored. The color album illustrates 720 decoratively correct color harmonies that can be executed in Super Kem-Tone, Kem-Glo and Quali-Kote wall paint.

Harry R. Dowswell, A.I.A., chairman of the Jury of Awards, made the presentation at the group's annual luncheon in New York. Other members of the jury were Ben H. Dyer, Charles M. Goodman and John C. Thornton, all members of the American Institute of Architects.

The Style Guide Companion was entered in the Class II competition, a category reserved for "literature offering technical information confined to the particular products of a single manufacturer." Awards were made on the basis of completeness, organization of material, convenience of reference and format. The annual competitions, of which this was the fourth, are aimed at giving recognition to excellence in product literature and at aiding manufacturers in increasing the technical and informative value of their presentations.

•

Canco Sends Special Ship To Hawaii To Rush Tinplate To Coast

An acute shortage of cans to pack the West Coast's highly perishable fruits and vegetables made necessary the chartering of a special ship to Hawaii on August 5, to bring back badly needed tinplate, according to an American Can Company report recently.

The $100,000 operation to rush tinplate from the company's large stockpile at the Hawaiian plants in time for the approaching harvest of food and vegetable crops, was a result of the 53-day steel strike which seriously depleted existing stockpiles, the report said.

The tinplate, which arrived on the steamer SS Alaskan is sufficient to manufacture more than 1,000 carloads of cans for packing foods, the company reported.

Federation Committees to Meet In Indianapolis, Sept. 19-20

The Executive and Finance Committees of the Federation of Paint and Varnish Production Clubs will meet in Indianapolis, Ind., on September 19 and 20, 1952, at the Marott Hotel.

Several other committees of the Federation also plan to hold meetings at the same time.

While in Indianapolis the Federation Committeemen will attend the September meeting of the CDIC Paint and Varnish Production Club on Friday, the 19th.

Reservations for rooms should be made directly with the hotel.

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Glycerine Producers' Ass'n. Establishes Research Awards

The Glycerine Producers' Association announced the establishment of a group of awards for outstanding research in the application of glycerine or glycerine derivatives. The awards to be given will consist of an honor plaque carrying a cash stipend of $1,000, and two honor certificates carrying stipends of $300 and $200 respectively.

In announcing the awards, Mr. E. Scott Pattison, Manager of the Glycerine Producers' Association, pointed out that glycerine is a widely applied material employed both as a chemical intermediate and in mixtures for its physical properties. The awards, he stated, were established for the purpose of acknowledging and encouraging research which advances still further the uses for glycerine and its derivatives in any product or process for industrial or consumer use.

As outlined by the Association, research work eligible for nomination may be concerned with chemical, physical, or physiological properties of glycerine, or with properties of glycerine-containing or glycerine-derived materials. The work may deal with applications which of themselves are currently or potentially of value to industry or the general public, or it may deal with scientific principles or procedures likely to stimulate future application. The Association emphasized that originality in extending the application of glycerine into new fields of usefulness will receive special consideration.

Work which has been successfully concluded or which has reached a clear-cut point of accomplishment during the current year will receive first consideration for the awards. Work carried on in previous years, but which has become significant commercially in 1952, will also be eligible.

The awards are open to any individual in the United States and Canada engaged in research, either in industry or in affiliation with a governmental or educational institution.

Official entry blanks required for making the nominations may be obtained from the Glycerine Producers' Association, 295 Madison Avenue, New York 17, N.Y.

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N.Y.U. Offers Three Graduate Courses in Surface Technology

The Graduate Division of the College of Engineering, New York University will offer the following graduate courses in surface technology:

Ch. E. 174-175 — Graduate lecture course on Surface Finishes, full course (1st and 2nd terms), Wednesday, 8:00-10:00 P.M.

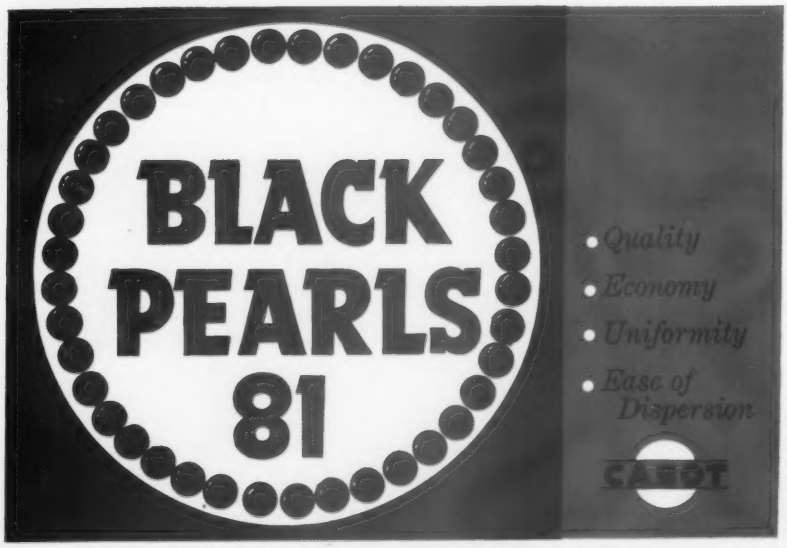
Ch. E. 176-179 — Surface Finishes Laboratory, full course (1st and 2nd terms), Friday, 7:00-10:00 P.M. This course may be taken simultaneously with Ch. E. 174-175.

Ch. E. 300-301 — For properly qualified students who are preparing for their thesis.

All courses are given by Dr. Max Kronstein.

Registration will be held from Sept. 16-19, Office of Graduate Div., 1st floor of South Hall, University Heights between 6:30-8:30 P.M. For additional information contact Dr. Henry J. Masson, Dean of Graduate Div., New York University, New York 53, N.Y.

Improved...
TO IMPROVE YOUR BLACK PAINTS



BLACK PEARLS 81 is a pelletized Cabot channel carbon black that is fast becoming the new standard of the paint industry for uniform color and ease of dispersion. Developed and produced to strictest quality specifications, Black Pearls 81 has now been improved to fill the most specific individual requirements.

That's why BLACK PEARLS 81 is used regularly by the world's largest manufacturers of industrial and automotive black paints.

SPECIAL BLACKS DIVISION
For Further Information..GODFREY L.CABOT, INC. 77 Franklin Street Boston 10, Mass.

NEW PRODUCTS & IMPROVEMENTS

A MONTHLY MARKET SURVEY

PALMER—SHILE

BARREL CRADLE
Toggle Type

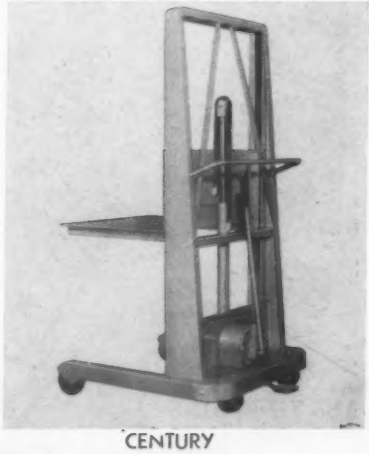
Barrel cradle is recommended for picking up any shape barrel, plywood or fiber drums, straight or biled sides, flat or chimed ends, (flush ends). Weighs approximately 45 lbs. Palmer-Shile Co., 16039 Fullerton, Detroit 27, Mich.

LONG OIL ALKYD
Improves Latex Paints

Aroplaz 1274, long oil, oxidizing type alkyd is recommended as a modifier for latex paints. One deficiency of copolymer emulsion paints has been the cohesive properties of the latex particles are often greater than their adhesive properties, with the result that the paint film can easily be stripped from the wall or undercoat. It is claimed that this alkyd resin corrects this balance by giving latex formulations greater adhesion to all types of surfaces. This resin imparts to latex formulation greater stability to freezing and thawing. Aroplaz 1274 reduces curing time, and offers a greater range of pigmentation than has been possible up to now in latex formulations U. S. Industrial Chemicals Co., Div. of National Distillers Products Corp., 120 Broadway, New York 5, N. Y.

DRIERS
For Odorless Paints

Called "Odorex" these driers were specially formulated for use in resin and oil base odorless paints, according to the manufacturer. It is claimed that these driers impart no odor to paints before, during or after application. The series include lead, cobalt, and manganese. It is reported that these driers equal the drying performance of other standard driers. Samples and technical information can be obtained by writing to Nuodex Products Co., Inc., Elizabeth F, N. J.



CENTURY

HYDRAULIC LIFT
1,000 lb. Capacity

Recommended for use whenever "material-plus-handling" costs can be lessened, the Century "1000" weighs only 150 lbs. and will raise a 1000-pound load from floor level to a height of 4 feet, or to any intermediate position. A small lever at the operator's fingertips releases the platform for controlled descent. The material platform — 23 by 24 inches — is elevated by a two-cylinder double acting reciprocating pump, containing only three moving parts.

For literature and price information, write Century Products Co., 5925 Highway #7, Minneapolis 16, Minn.

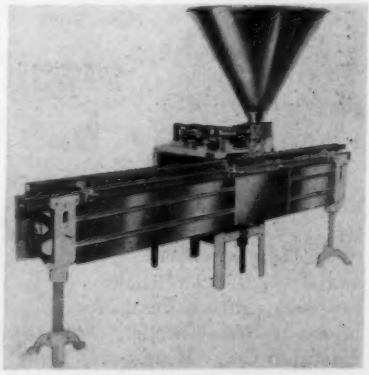
COLOR DISPERSIONS
For Latex Paints

Line of color dispersions for latex emulsion paints include Richmond and Fastolux Greens, Fastolux Blues, Toluidine Red pastes and Permanent Yellow paste. The manufacturer states that these dispersions have been checked for compatibility with various copolymer latex paint-systems, and have proven satisfactory in all cases. These dispersions, in combination with other pigments such as iron oxides and whites, will permit the formulator to develop a wide range of deep tones and tints. For further details concerning these dispersions write to Ansbacher-Siegle Corp., Rosebank, Staten Island 5, N.Y.

AUTOMATIC FILLER
For Liquids and Semi-Solids

It is claimed that 40 to 60 containers per minute is now possible with "Simplex" two-piston filler. Eight-foot long chain conveyor transports cartons, cans or jars under dispensing pistons that are adjustable from 2 oz. to quarts and gallons. Unit is equipped with 40 gallon cone or "U" shaped hopper. Dismantling time is less than 8 minutes, according to the manufacturer. F. L. Burt Co., 571 7th St., San Francisco 3, Calif.

F. L. BURT



NEW PRODUCTS

BRADLEY

MOISTURE METER
Electronic Type

Model BD-10 supplants Model BD-3. Based on wide experience gained through users of moisture meters, improvements in the new Model in basic electronic engineering, ruggedness of construction, and compactness have been incorporated.

Model BD-10 has been reduced in size to dimensions of only 3½ x 5-3/4 x 8 inches which includes the stout self carrying case. A shoulder strap suspension (standard equipment) leaves both hands free while meter is in operation facilitating its use in difficult positions on ladders or scaffolds and in low head-room basement excavations etc. The newly designed dial has extra large percentage numerals for easy readability. A completely separate battery compartment makes battery renewal simple and speedy. The solid plastic electrode is of high insulating value and of extra heavy duty construction. The meter tests instantly all such surfaces as wood, asbestos shingles, plaster, stucco, brick, and concrete.

Complete information may be had direct from L. R. Bradley & Co., 25 W. 45th St., New York 19, N. Y.

PLASTICIZER
For Nitrocellulose

Di-isobutyl phthalate is recommended as a possible replacement for dibutyl phthalate in cellulose nitrate formulations. It is said that di-isobutyl phthalate imparts low temperature flexibility to cellulose nitrate films. Tennessee Eastman Co., Kingsport, Tenn.

BALANCE
Speed and Accuracy

Analytical balance is said to combine speed with accuracy. In effect this unit is two balances in one; first a high speed projection balance with a stability reading 0.1 milligram; may be used as an analytical balance with reading to 0.01 milligram by means of a simple sensitivity shift. Weighings to an accurate fourth decimal place are obtained in seconds by straight projection, or to the fifth decimal place by shifting sensitivity and adding an additional decade of weights. Voland & Sons, Inc., New Rochelle. N. Y.

VLOAND

ALKYD RESINS
For Odorless Paints

Rezyl 406-22 and Rezyl 874-22 are two new alkyd resins which make possible the formulation of a complete line of odorless paints ranging from flat wall paints to gloss enamels. 406-22 can be used to produce easy brushing, non-penetrating flat finishes, and 874-22 can be employed to create quality surfaces with high gloss.

Blends of the two odorless resins also make it possible for paint manufacturers to produce a wide variety of intermediate finishes including egg shell and semi-gloss enamels thus allowing economy and quality control advantages. American Cyanamid Co., Coating Resins Dept., 30 Rockefeller Plaza, New York 20, N. Y.

ODORLESS SOLVENTS
Light and Heavy Types

Tank car quantities of light and heavy odorless solvents are available for the paint industry. These solvents are primarily used in the manufacture of odorless paints. They may also be used by the home owner as a thinner during application. Sinclair Refining Co., 600 Fifth Ave., New York 20, N. Y.

TRIBUTYL PHOSPHATE
Anti-Foam Agent

Tributyl phosphate is recommended as an anti-foam agent in the production of paints, water-soluble adhesives, inks, casein solutions and rubber latex. It is colorless and odorless. Ohio-Apex, Inc., Div. of Food Machinery and Chemical Corp., Nitro, West Virginia.

CONTAINER MOVER
Handles Full Drums

Unit will lift and move full open drums or containers of various sizes with their covers removed. According to the manufacturer, small batches may be run in the shipping container, the filling of open head drums hastened by removing them for covering, and the transfer of materials facilitated. Dispersion Specialties Supply, 297 Lincoln Ave., Orange, N. J.

DISPERSION

Can you promote adhesion in your exterior primers at lower cost?

Yes! As many leading paint manufacturers will tell you... you *can* with Dutch Boy Basic Silicate White Lead "45 X."

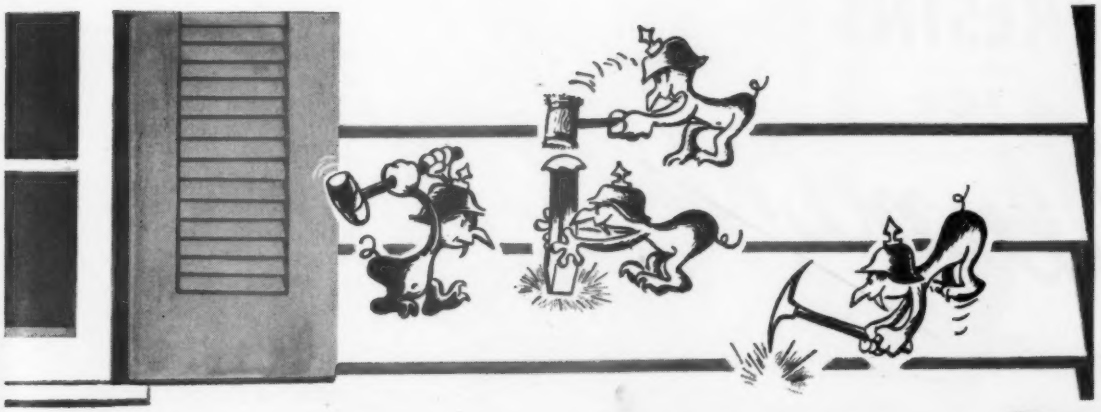
Not only does this unique form of white lead provide the lead soaps you need to promote adhesion. And not only does it give the film the water resistance needed to maintain its adhesive bond and help prevent peeling...

It also gives you these qualities *most efficiently and economically.*

Dutch Boy Basic Silicate White Lead "45 X" concentrates the reactive portion of each pigment particle at the surface. Thus proportionately larger amounts of "lead" are made available.

And you use fewer pounds of pigment, too. 60 to 63 weight units of Dutch Boy Basic Silicate White Lead "45 X" can replace 100 weight units of standard white lead types.

Try this latest development in white lead in your exterior primer formulations. See how it reduces costs, without sacrificing quality.



Dutch Boy*
Basic Silicate White Lead
"45 X"

"lead" at its efficient, economical best

*NATIONAL LEAD COMPANY: New York 6; Atlanta; Buffalo 3; Chicago 8; Cincinnati 3; Cleveland 13; Dallas 2; Philadelphia 25; Pittsburgh 12; St. Louis 1; San Francisco 10; Boston 6 (National Lead Co. of Mass.). *Reg. U. S. Pat. Off.*

NEW PRODUCTS

ZIRCONIUM DRIER
Hardens Paint Films

Zirco Drier Catalyst is basically a zirconium chemical complex in mineral spirits solution and contains a standardized metal content of 6% zirconium metal. The synergistic quality of this catalyst in combination with the regularly used metals, such as cobalt, manganese, lead and calcium gives the paint formulator a new drying auxiliary on which he may depend for film hardness. In combination with cobalt, this drier may be used to produce much greater film hardness than obtainable with cobalt or cobalt-lead combinations. It may be used to replace a portion of the cobalt or manganese drier with findings generally showing equal drier speed, better hardness and gloss with improved adhesion. Advance Solvents and Chemical Corp., 245 Fifth Ave., New York, N.Y.

SILICONE CHEMICAL
Additive for Water Paints

Sodium methyl siliconate has a variety of potential applications in numerous industries. Although the major use for the product at this time is for masonry water repellents, it was stated by the company that developmental work indicates that SC-50 may make significant contributions to other fields. These include water repellents for textiles and paper products, catalyst preparations, water-repellent aerogels, additives for sodium silicates, and additives for water-base paints to improve washability.

SC-50 is non-inflammable, noncorrosive and odorless.

Supplied as a liquid with 20 per cent silicone solids content, (31 per cent total solids), SC-50 is light amber in color and can be cured at ambient temperatures. By following suggested handling instructions, it can be dried to a white powder which can be redissolved in cold water. General Electric Co., Chemical Div., Pittsfield, Mass.

LATICES
Varied Uses

Chemigum Latex 235BHS and Chemigum Latex 245CHS are of special interest to paper and textile converters. 245CHS adds a high solids, anionic stabilized copolymer to the 245 series, and 235BHS adds a high solids, minimum stabilized latex to the 235 series of butadiene-acrylonitrile copolymers. Butadiene-acrylonitrile latices are used in the compounding of adhesives, plasticization and modification of vinyl, rubber and resinous latices, modification of asphalt emulsions, and formulation of specialty coatings as well as for coating and impregnating paper, fabric, and leather. Goodyear Tire and Rubber Co., Chemical Div., Akron, Ohio.

ACRAWAX C
Improves Paint Films

Incorporation of Acrawax C (0.5 to 2%) in coating formulations improves mar-resistance, water and salt spray resistance of paints, varnishes and lacquers. Good transparency and optical flatness are obtained in furniture finishes with this wax. Also, the sanding property of sanding sealers is improved without reducing the integrity of the lacquer film. Detailed information is provided in the bulletin "Acrawax C in Paints, Varnishes and Lacquers." Glyco Products Co., Inc., 26 Court St., Brooklyn 2, N. Y.

Consider also these additional factors—low cost, no need to cook, ease of formulation! You'll see why it pays to use Neville Resins!

Samples and technical data supplied promptly.

Neville Coumarone Resins and Resin Solutions are free from leaf-retarding elements and hence are in great favor for use in ready mixed aluminum paints. Actual records of paint manufacturers show excellent leafing in cases where cans have been stored five years, or even longer!

THE NEVILLE COMPANY NEVILLE PITTSBURGH 25, PA.

Plants at Neville Island, Pa., and Anaheim, Cal.

RESINS – COUMARONE-INDENE • MODIFIED COUMARONE-INDENE • PETROLEUM • ALKYLATED PHENOLS
OILS – SHINGLE STAIN • NEUTRAL • PLASTICIZING • RUBBER RECLAIMING • CREOSOTE
SOLVENTS – 2-50-W HI-FLASH • CRUDE & REFINED COAL-TAR • WIRE ENAMEL THINNERS
SPECIALTIES – PHENOTHIAZINE • RUBBER COMPOUNDING MATERIALS • TAR PAINTS

P 47

Age can't hurt this white any more than Johnny's dirty hands!

Neo-Fat 11 helps form tough, flexible, permanent non-yellowing alkyds

Johnny's dirty hand prints will wipe off easily—and this refrigerator will still be white when it has been cleaned thousands of times. That is because the manufacturer used Neo-Fat 11 to produce a non-yellowing alkyd vehicle that has many excellent characteristics.

Urea resins by themselves are very brittle, and before they can be used for appliance enamels, they must have flexibility built into them. Lauric modified alkyds, as formed with Neo-Fat 11, go hand in hand with urea resins to form superior protective coatings. Their properties support one another, resulting in a clear, strong, hard and chemical-resistant film.

Because Neo-Fat 11 has less than 1% unsaturated fatty acid content, high-baked enamel produced with this chemical in resin formulations has a final film that is permanently tough and flexible. Such enamels will not take on a dingy, yellowed appearance. Appliances will stay white for years and years.

Lauric fatty acid also finds use in the manufacture of plasticizers for nitro-cellulose lacquers.

Write today for samples, specifications and prices.

ARMOUR *Chemical Division*

Armour and Company • 1355 W. 31st Street • Chicago 9, Illinois

Mail this coupon today!

Please send me:

☐ A sample of Neo-Fat 11

☐ Information about Neo-Fat 11

*Name*_____ *Title*_____

*Firm*_____

*Address*_____

*City*_____ *Zone*____ *State*_____

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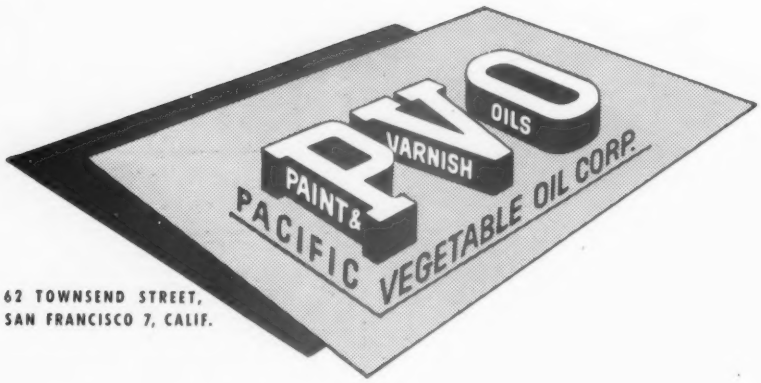
ON IMPORTED VEGETABLE OILS?

TUNG OIL · OITICICA OIL

PVO can rush your shipment from drum and warehouse stocks near you.

Another reason to see your PVO man *first* when you're in the market for vegetable oils.



62 TOWNSEND STREET,
SAN FRANCISCO 7, CALIF.

Industrial oils: Linseed, Tung, Safflower, Soya, Oiticica, Castor, Sardine. Also Coconut Oil, Tallow, Cottonseed Oil, Lard, Walnut Oil and others.

BALTIMORE, MARYLAND
W. R. McClayton

BOSTON, MASSACHUSETTS
Raw Material Company

CHICAGO, ILLINOIS
The Daniel G. Hereley Company

CINCINNATI, OHIO
Deeks & Miller, Inc.

CLEVELAND, OHIO
The Donald McKay Smith Company

DALLAS, TEXAS
W. W. Richerson Co.

DETROIT, MICHIGAN
Geo. E. Moser & Son, Inc.

LOS ANGELES, CALIFORNIA
California Flaxseed Products Company

LOUISVILLE, KENTUCKY
B. H. Boyet and Company
Deeks and Miller Company

MINNEAPOLIS, MINNESOTA
Horton-Earl Company

MONTREAL, QUEBEC, CANADA
B. & S. H. Thompson and Company, Reg'd.

NEW ORLEANS, LOUISIANA
Russell Chemical Company

NEW YORK CITY, N. Y.
Garrigues, Stewart and Davies, Inc.

PHILADELPHIA, PENNSYLVANIA
Baker Industrial Oil Company

PITTSBURGH, PENNSYLVANIA
Emmett D. Griffin, Jr.

PORTLAND, OREGON
W. Ronald Benson, Inc.

SEATTLE, WASHINGTON
W. Ronald Benson, Inc.

ST. LOUIS, MISSOURI
Ivan T. Bauman Co.

TORONTO, ONTARIO, CANADA
B. & S. H. Thompson Company

NEW PRODUCTS

SILICONE RESIN
For Electric Insulation

Silicone resin for Class H electric insulation maintains its bonding strength and hardness at high temperatures.

Designated as SR-98, the new product permits greater design, flexibility in motors, transformers, and generators where vibration is a factor, according to the manufacturer.

Having excellent solvent and abrasion resistance over a wide temperature range, it is reported that SR-98 forms an exceptionally hard, tough, insulating film.

This silicone resin is supplied at 50 per cent solids content and is light amber in color. It can be thinned with xylene, toluene, or petroleum spirits. No catalyst is required.

SR-98 has also been used as a vehicle for caulking and sealing compounds. Filled with an inert material such as mica dust or talc, 25 per cent -50 per cent by weight, the resulting paste may be applied between layers of coil insulation. A heat stable seal results after curing.

General Electric Co., Chemical Div., Pittsfield, Mass.

OIL-MODIFIED ALKYD
For Wall Finishes

Rezyl 405-18 is an oil-modified alkyd resin for non-penetrating, self-sealing flat wall finishes. It is claimed that flat finishes made from this resin can be applied to a variety of surfaces ranging in porosity from enamels to wall paper without showing differences in color or gloss.

The resin is supplied in an aliphatic petroleum solvent selected for its solvency and "wetedge" characteristics. May be reduced with mineral spirits or lower solvency thinners as desired. When properly pigmented, this resin produces white, pastel, or deep-tone colored paints with good brushing properties, color retention, scrub resistance and film uniformity. American Cyanamid Co., Coating Resins Dept., 30 Rockefeller Plaza, New York 20, N. Y.

TINTING BLACK
Minimum Flooding

"Black Shield Double-X" is recommended as a tinting black for a wide variety of paints including oleoresinous, alkyd, phenolic, chlorinated rubber, nitrocellulose, ethyl cellulose, styrenated products, petroleum and urea resins. According to the manufacturer, this product has a high lampblack content giving it unusual tinting strength. It has a minimum of flooding tendency, good storage stability and low viscosity for ease of handling. Hegeman gauge shows the grind to be fine, 7½ to 8. Sold in 5 gallon units. Carbon Dispersions, Inc., Newark, N. J.

GEIGER ATTACHMENT
For Diffraction Work

Geiger-counter is designed for use as an attachment to Weissenberg cameras, being used in conjunction with the counting circuits and the recorder as employed with the Phillips X-ray spectometer.

Weissenberg goniometer as adapted to Geiger counter operation provides accurate data for crystal structure investigations. It is especially valuable for electron distribution problems, and quickly determines reflection intensities of single crystals.

North American Philips Co., Inc., 750 South Fulton Ave., Mt. Vernon, N. Y.

Flattens the Finish . . . With High Mill Room Savings

SYLOID 308 produces a lower gloss finish economically. Mill room savings are increased. Syloid mill bases can be made highly concentrated . . . with a very short grinding time. Less flatting agent is required . . . mill room capacity is often doubled. **SYLOID 308** is a finely-sized synthetic silica of extremely high purity produced under rigid production controls. Uniformity of product insures uniform results.

Realize new high standards in flatting efficiency . . . mill room economy . . . film characteristics . . . use **SYLOID 308**. For further information or help on your specific problem . . . write Davison's Technical Service Dept.

*T. M. Reg. Applied For

Progress through Chemistry

THE DAVISON CHEMICAL CORPORATION

Baltimore 3, Maryland

PRODUCERS OF: CATALYSTS, INORGANIC ACIDS, SUPERPHOSPHATES, PHOSPHATE ROCK, SILICA GELS, SILICOFLUORIDES AND FERTILIZERS

NEW PRODUCTS

ACRYLIC MONOMER
Varied Uses

Acrylamide is a crystalline product with comparatively long shelf life and easily-gained polymerization and copolymerization.

Potential applications for the polymers and copolymers of this monomer include the preparation of adhesives, dispersing agents, thickening agents, surface coatings, synthetic leathers and rubbers, and finishing agents for paper and textiles. Modification of acrylonitrile fibers by the incorporation of Acrylamide is said to produce an approved affinity for acid dyes.

Acrylamide's reactive double bond readily permits the addition of a variety of compounds such as alcohols, amines, mercaptans and dienes. It is reactive to formaldehyde, forming methylolacrylamide or methylenebisacrylamide. This general reactivity makes Acrylamide of value as a chemical intermediate as well as a monomer. Available in trial lots. American Cyanamid, New Product Development Dept., 30 Rockefeller Plaza, New York 20, N. Y.

MOISTURE METER
For Testing Pigments

Electronic moisture testing instrument is used for measuring the moisture content of dry granular materials including paint pigments. Model G5, according to the manufacturer incorporates new features which permit rapid and easy readings of moisture content of various materials.

Two important features of the G5 which add to its superiority are its versatility and the speed and ease with which accurate moisture content readings can be made. The instrument consists of four separate units, — the master measuring unit, the interchangeable range box, the sampling unit consisting of electrode and sample cup, and hydraulic press complete with pressure gauge. The master measuring unit remains the same for all applications. The other three units can be interchanged when necessary to test a wide variety of materials or moisture ranges.

Other features of the new G5 include a hydraulic press which eliminates the need for accurate weighing and measuring of samples to be tested. In use, the sample cup is filled, placed on a 5-ton hydraulic press and the material is compressed to a pre-determined pressure as read on a built-in hydraulic gauge.

The plug-in range box is then inserted at the base of the measuring cup, and the moisture content of the material is instantly read on a micro-ammeter located on the master measuring unit.

It can be used as a production line testing instrument which does not require the services or attendance of a skilled operator. Brochure containing complete information may be obtained by writing Moisture Register Co., 1510 W. Chestnut St., Alhambra, Calif.

FLASH TESTER
Closed Cup

Electrically-heated closed cup tester is used for determining the fire points of volatile, flammable liquids flashing below 175 deg. F., in accordance with ASTM Method D-56. This instrument represents a notable improvement over the gas or alcohol-heated devices currently used. Advantages of the Electric Flash Tester, according to the manufacturer, are greater accuracy of temperature control; wide heater temperature range (100-700 deg. F.); and greater safety. For more information concerning this unit contact Precision Scientific Co., 3737 W. Cortland St., Chicago 47, Ill.

Look at... HYDROCARBON PANAREZ RESINS

AS A QUALITY ECONOMICAL RESIN IN OLEO RESINOUS VARNISHES

PANAREZ resins are compatible in oleo-resinous varnishes with phenolics, ester gums, hydrogenated rosins, coumarone-indene, and many other commonly used synthetic resins. These neutral and inexpensive varnish resins markedly improve chemical and mar resistance of protective finishes.

For economy—for uniformity and consistent high quality—for dependability—Pan American PANAREZ resins are unexcelled.

Whether you purchase in carload or single drum quantities, prompt "on time" shipments from plant, or conveniently located warehouses insures uninterrupted maintenance of production schedules.

	Color Gardner	Softening Point, °F	Iodine Number	Acid Number
PANAREZ 3-210	9	200-220	230	0-1
PANAREZ 6-210	11	200-220	170	0-1
PANAREZ 12-210	16	200-220	60	0-1

PAN AMERICAN CHEMICALS DIVISION Pan American Refining Corp. Chemicals

122 EAST 42ND STREET · NEW YORK 17, N. Y.

Personnel Changes

CONTINENTAL CAN

Arthur E. Stevenson, assistant general manager of the Research division, has retired after 26 years with the firm. Mr. Stevenson, an outstanding food technologist, received the Nicholas Apert Award last year from the Institute of Food Technologists, for his work in the field. He served on the War Production Board in World War II as a Technical advisor.

A. E. Stevenson

Mr. R.S. Hatfield, Mr. Frank I. Gill, and **Mr. John L. Heinlein** have been given new managerial posts with full responsibility for sales and manufacturing operations within a given district.

C. K. WILLIAMS & CO.

Irwin C. Clare and **Mark Hoffman** have been appointed assistant directors of research. For the past three years Mr. Clare has been chief of the paint section of the firm's research laboratory. Mr. Hoffman has served as assistant plant superintendent and chief plant chemist.

SHERWIN-WILLIAMS

H. J. L. Cotton has been named technical coordinator responsible for the general supervisor of technical department activities in the fields of industrial products finishes, and transportation finishes.

H. E. Spitzer was appointed director of development, with general supervision of the paint, varnish, and lacquer laboratories at Chicago.

KRUMBHAAR CHEMICALS

Harry W. Gaffney has been appointed sales representative for hard synthetic resins in greater Philadelphia, eastern Pennsylvania, southern New Jersey, and Delaware. Mr. Gaffney's offices are at 1510 Girard Trust Building, Philadelphia.

AMERICAN-MARIETTA

Louis K. Buell has rejoined the company as chief chemist in charge of research and development in the new coatings division. He will concentrate primarily on the improvement, production, and application of roll coat finishes capable of withstanding severe mechanical forming.

UNITED CARBON

William S. Rea has been promoted to general sales consultant, a position formerly held by the late **Mr. William W. Higgins.**

Jack B. Barr succeeds Mr. Rea as eastern district sales manager.

3 M'S

Donald R. Guthrie has been appointed executive engineer in charge of engineering research. Mr. Guthrie will organize an engineering research group consisting of three sections: chemical engineering, machine development and instrument engineering.

LIBBEY-OWEN

Henry C. Stumpe has been appointed head of the newly re-established Cincinnati branch office for coating resins at 617 Vine street in the Enquirer building. Mr. Stumpe was formerly Cleveland sales office manager for the Interchemical corporation's finishes division.

HOOKER ELECTROCHEMICAL

Dr. Harvey R. Engle has been promoted to Works Chemist of the Works Laboratory. **Mr. Burr H. Ritter,** who recently retired, formerly held the position.

THE FOURTH DICALITE PLANT

...will add approximately 80% increased production capacity for Dicalite calcined and processed filteraids and fillers

The new plant of the Dicalite Division, Great Lakes Carbon Corporation, at Lompoc, Calif., is now in volume production at a continually increasing rate. It represents over 5 years of engineering, design and construction, and is the largest complete unit for processing diatomite built in the last 22 years. Full designed output will add approximately 80% increased production capacity for Dicalite calcined and processed filteraids, fillers and other materials.

Four Dicalite plants are now running 24 hours a day to produce the maximum tonnage of Dicalite materials to supply the emergency demand.

Even during this extreme pressure for volume production, specifications for performance and quality of each product are readily maintained. Research data are being accumulated to aid in developing new and improved Dicalite products for future industrial use.

DICALITE DIVISION GREAT LAKES CARBON CORPORATION

GLC

NEW YORK 17 • CHICAGO 1 • LOS ANGELES 17

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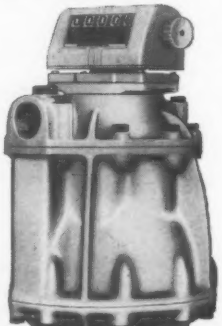

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CALENDAR OF EVENTS

Sept. 9-13. National Chemical Exposition, Colisem, Chicago, Ill.

Sept. 14-19. Fall Meeting of Div. of Paint, Varnish and Plastics Chemistry, ACS, Chalfonte-Haddon Hall. Atlantic City, N.J.

Oct. 8-10. American Tung Oil Ass'n. Annual Meeting, Admiral Semmes Hotel, Mobile, Ala.

Nov. 17-19. National Paint, Varnish and Lacquer Ass'n. Annual Convention, Palmer House, Chicago, Ill

Nov. 20-22. Federation of Paint and Varnish Production Clubs Annual Meeting, Palmer House, Chicago, Ill.

Nov. 18-22. Paint Industries' Show, Palmer House, Chicago, Ill.

Production Club Meetings

Baltimore, 2nd Friday, Belvedere Hotel.

Chicago, 1st Monday, Furniture Mart.

C.D.I.C., 2nd Monday.
Cincinnati — Oct., Dec., Mar., May, Cincinnati Club;
Dayton — Nov., Feb., April, Van Cleve Hotel;
Indianapolis — Sept., Claypool Hotel;
Columbus — Jan., June, Fort Hayes Hotel.

Cleveland, 3rd Friday, Harvey Restaurant.

Dallas, 2nd Thursday, No Fixed Place.

Detroit, 4th Tuesday, Rackham Building.

Golden Gate, Last Monday, El Jardin Restaurant, San Francisco.

Houston, 2nd Tuesday, Seven Seas Restaurant.

Kansas City, 2nd Thursday, Pickwick Hotel.

Los Angeles, 2nd Wednesday, Scully's Cafe.

Louisville, 3rd Wednesday, Seelbach Hotel.

Montreal, 1st Wednesday, Queen's Hotel.

New England, 3rd Thursday, Puritan Hotel, Boston.

New York, 1st Thursday, Building Trades Employers Assn.

Northwestern, 1st Friday, St. Paul Town and Country Club.

Pacific Northwest, Annual Meetings Only.

Philadelphia, 3rd Wednesday, Engineer's Club.

Pittsburgh, 1st Monday, Fort Pitt Hotel.

St. Louis, 2nd Tuesday, Forest Park Hotel.

Southern, Annual Meetings Only.

Toronto, 3rd Monday, Diana Sweets, Ltd.

Western New York, 1st Monday, 40-8 Club, Buffalo.

J. C. Konen

R. W. Mairs

ARCHER-DANIELS-MIDLAND

Robert W. Mairs and **James C. Konen** have been elected assistant vice presidents. Mr. Mairs is manager of the company plant located at Los Angeles and is charge of sales in California and adjacent areas. He started with the company in 1939. Mr. Konen joined the company in 1935 and has been director of the ADM research laboratory since 1943. He is a member of the American Chemical Society, the Fat Analysis Committee of the American Oil Chemists Society, Committee D-1 of the American Society of Testing Materials, the Evaluation Committee of the Federation of Paint and Varnish Production Clubs, and the Paint Industry Technical Advisory Committee for the National Production Authority.

DOW CHEMICAL

Raymond F. Boyer has been appointed manager of plastics and high polymer research succeeding L. C. Chamberlain who was promoted to assistant director of research.

R. F. Boyer

Dr. William C. Bauman will take over Mr. Boyer's former position directing the company's physical research laboratory. He had been assistant director of the laboratory since 1948.

Mr. Boyer joined Dow in 1935. He became internationally recognized for his work in the physical chemistry of plastics while working in the firm's physical research laboratory. Mr. Boyer became assistant director of the laboratory in 1945 and director in 1948.

MONSANTO

John M. Cochran has been appointed technical sales representative for surface coating resins in the plastic division's Chicago sales district. Mr. Cochran joined Monsanto in 1951 as a member of the surface coating resins, technical service group.

BLACKMER

Elmer H. Lanthorn has been appointed general sales manager. Mr. Lanthorn has been associated with the Peerless Pump Division of the Food Machinery & Chemical Corporation since 1946 in engineering and sales management functions. He was layout engineer with the Dravo Corporation for five years and an engineer in the navy in World War II.

BRAZIL OITICICA

The A. E. Fleming Co., 1900 East Jefferson Ave., Detroit 7, Michigan, has been appointed exclusive sales agent in Michigan. Mr. Arthur E. Fleming, for many years associated with Baker & Collinson, has handled Brazil's oil product since 1939.

HARDESTY & CO.

Maurice J. McCarthy has joined Hardesty & Co. as director of sales. Most of Mr. McCarthy's experience has been in the fats and oil industry. For the past twenty years he was associated with A. Gross & Co. as vice president and treasurer.

DIXON

Ralph C. Gough has been appointed special representative in the New England area by the Joseph Dixon Crucible Company. He is a member of the New England Paint Salesmen's Club.

WITCO CHEMICAL

K. W. George has been appointed controller of Continental Carbon and its affiliated carbon black companies.

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PARA-TERTIARY-AMYLPHENOL

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McPherson

AMERICAN CYANAMID

Mr. R. A. Heokelman has been appointed assistant general manager of the Plastics and Resin Division. He had been assistant treasurer and comptroller since 1941.

Mr. J. D. McPherson has been appointed sales supervisor of the Organic Acids and Plasticizers department. He was formerly assistant director of purchases in the general purchasing department. Mr. McPherson joined Cyanamid's engineering department in 1945.

F. S. Dubbs has been appointed Philadelphia branch manager of the coating resins department. Mr. Dubbs joined Cyanamid in 1926 and was assistant manager of the Industrial Chemicals division's Philadelphia Office prior to his new appointment.

J. K. Morris has been appointed New England branch manager of the coating resins department. He will operate out of the firm's newly consolidated office in Boston. Mr. Morris joined American Cyanamid in 1932.

BAKELITE

L. K. Merrill has been appointed vice-president in charge of products and process development. He joined the National Carbon Company in 1920 serving both in the development laboratories and as superviser of production operations. Mr. Merrill directed the original development work on the utilization of Vinylite resins. In 1941 he was transferred to the Bound Brook plant of Bakelite Company as assistant superintendent in charge of the Vinylite Plastics development laboratories.

L. K. Merrill

GENERAL ELECTRIC

Dr. Robert H. Krieble has been named manager of engineering for the chemical materials department of GE's chemical division. He received his Ph. D. at Johns Hopkins in 1939, and has been with the company since 1943.

George M. Yesse has been appointed manager of facilities engineering for the chemical division.

W. M. Remy

J. Patterson

SHERWIN-WILLIAMS

Wilbur M. Remy has been appointed manager of dealer sales and **John P. Patterson** has been named manager of the painter maintenance department. Mr. Remy joined the firm in 1927 as a member of the paint development department. He managed Sherwin-Williams branches in Uniontown, Pa., and Yonkers, N.Y.

Mr. Patterson managed the company's branches in Atlanta, Decatur and Marietta, Ga., and in Pensacola, Fla.

SHELL CHEMICAL

J. M. Selden has been appointed manager of the eastern division. He had been sales manager of the division since 1946. Mr. Selden has been associated with the marketing of Shell chemical products since 1933, first as vice-president and director of R. W. Greeff & Co., eastern sales agent for Shell until 1946. Mr. Selden had much to do with the successful marketing of important new additions to the firm's lone of solvents, industrial chemicals and resins and plastics, such as glycerine, ethyl alcohol, and Epon R resins.

J. M. Selden

R-B-H DISPERSIONS

Joseph D. Garrison is again representing the pigment dispersion division in the St. Louis territory. Mr. Garrison joined R-B-H in 1946 as a sales trainee. He served two years with the Compo Chemical Company as sales manager before returning to R-B-H.

CELANESE

William Milheim has been appointed sales representative for the South-eastern district, which includes, Virginia, North Carolina, South Carolina, Georgia, Florida and Tennessee. He will operate from Celanese's new branch office at 1603 Liberty Life building, Charlotte 2, N. C.

CALCO CHEMICAL

E. C. Metcalf has been named head of the coal tar chemicals department of the Calco Chemical Division of the American Cyanamid Co., succeeding the late Q.T. Dickinson.

McDOUGAL-BUTLER

Justin A. Shook has been appointed to the sales staff for Washington D.C. and vicinity.

CENTRAL PAINT

B. Robert Brown has been appointed sales-advertising manager of Central Paint & Varnish Works, Inc.

VITA-VAR

Renshaw Smith Jr., has resigned his position of vice-president and director of sales. He joined the firm last fall.

CABOT

Franklin King Jr., has been appointed to the Wollastoinite sales staff of Godfrey L. Cabot, Inc., of Boston, Mass. He was formerly with the E. & F. King & Company of Norwood, Mass.

PITTSBURGH PLATE GLASS

Dr. George S. Bachman has been appointed research director of the new fiber glass division. He had been with the firm's glass division's research laboratories at Creighton, Pa., since 1947 when he joined the company.

PIERCE & STEVENS

George M. Askin has been appointed assistant sales manager of the specialties division. He joined Pierce & Stevens in 1947 as head of the billing and order department.

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Polyvinyl Acetate Emulsion Paints

U. S. Patent 2,601,315. George O. Morrison, Milltown, N. J., and Daniel Schoenholz, New York, N. Y., assignors to Shawinigan Products Corporation, New York, N. Y., a corporation of New York.

Process for the manufacture of polyvinyl acetate emulsion paints characterized by good paintability, brushability, leveling, covering power, and adhesion to old oil paint surfaces, which comprises vigorously agitating a polyvinyl acetate emulsion prepared by polymerization of vinyl acetate in aqueous suspension and having a maximum average particles size of 5 microns and containing a wetting agent, and mixing therewith, without the aid of applied heat, a conditioning agent for the polyvinyl acetate resin, an adhesion-promoting resin, an aqueous pigment paste, and an added quantity of a wetting agent to bring the total content of wetting agent to no more than about 0.455% of the total paint composition, and continuing the mixing until a uniform dispersion is obtained.

Drying Oils

U. S. Patent 2,598,729. Howard M. Teeter, Peoria, Ill., assignor to the United States of America as represented by the Secretary of Agriculture.

The method which comprises subjecting an ester of an aliphatic acid containing at least 8 carbon atoms in the acyl radical, said acid containing halogen substituted in the acyl radical and said substitution of halogen being upon non-adjacent carbon atoms, to the action of one of the group consisting of salts of organic carboxylic acids and salts of inorganic oxygen-containing acids, the acids of said salts possessing an ionization constant of less than $2X10^{-5}$.

Oil Soluble Furfural Phenol Resins

U. S. Patent 2,601,498. Lloyd H. Brown, Chicago, Ill., assignor to The Quaker Oats Company, Chicago, Ill., a corporation of New Jersey.

The method for producing an oil soluble resin which comprises heating a mixture consisting of furfural and phenol in the approximate ratio of 1 to 4 in the presence of a basic catalyst until a viscous liquid is obtained, adding acid thereto until said mixture is slightly acid and then removing the excess phenol and water therefrom.

Asbestos-Aluminum Powder Paint

U. S. Patent 2,598,854. Frederick A. Stolz, San Francisco, and Edley J. Vaught, Jr., Oakland, Calif., assignors to Pabco Products Inc., a corporation of Delaware.

A solvent thinned metallic ornamental paint consisting essentially of a binder of bituminous material selected from the group consisting of asphalt, coal tar pitches and stearine pitches, and coumarone-indene resin, in proportions of about 25% to 75% by weight of the bituminous material to about 75% to about 25% by weight of the resin; volatile solvent for the binder; aluminum powder; and a filler, the major proportion of which is asbestos fiber; the total quantity of binder and the solvent constituting about 67% to about 82% of the total weight of the paint; the total quantity of the filler and the aluminum powder constituting about 18% to about 33% the total weight of the paint; the solvent to binder ratio being about 3 to 6 parts by weight of the solvent to about 1 part by weight of the binder; the filler to aluminum powder ratio being about 0.8 to 2.5 parts by

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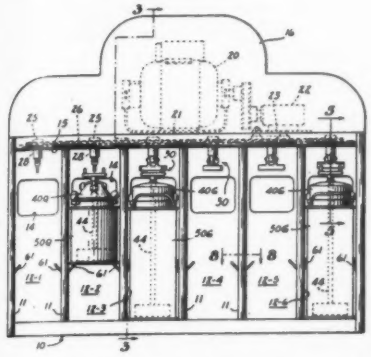
weight of the filler to about 1 part by weight of the powder; the binder to aluminum powder ratio being about 1 to 2 parts by weight of the binder to about 1 part by weight of the aluminum powder; and the binder to the filler ratio being about 0.55 to 1.7 parts by weight of the binder to about 1 part by weight of the filler.



U. S. PATENT 2,603,461

Mixing Machine

U. S. Patent 2,603,461. Paul Marienthal, Detroit, Mich.; National Bank of Detroit and Benjamin Shwayder, executors of the estate of said Marienthal, deceased, assignors to The Sherwin-Williams Company, Cleveland, Ohio, a corporation of Ohio.

In a mixing machine comprising a rotatable driving spindle, a drive therefor, a removable container for material to be mixed in said machine, a mixing head mounted on said container, a rotatable shaft for operating said mixing head, a releasable coupling connecting said spindle and said shaft comprising a key member carried by one of said rotatable elements and pivoted for pivotal movement about an axis transverse to the axis of said one rotatable element, a coupling member carried by the other of said rotatable elements and cooperating with said key member, said coupling element being movable relative to said key member to engage and to disengage said coupling element and key member while maintaining the rotation of said driving spindle.

Synthetic Drying Oils From Polyvinyl Alcohol

U. S. Patent 2,601,561. Glenwood L. Schertz, Wilmington, Del., assignor to Hercules Powder Company, Wilmington, Del., a corporation of Delaware.

A water-insoluble reaction product of a polyhydric alcohol and at least one mol per hydroxyl mol of the polyhydric alcohol of an ethylenically unsaturated fatty acid material of the group consisting of unsaturated fatty acids containing at least 14 carbon atoms and mixtures thereof, said polyhydric alcohol being a member of the group consisting of polyvinyl alcohols having an average molecular weight of from 6,000 to 80,000 and such polyvinyl alcohols which are acetylated to any extent up to and including 60%.

Asphalt Composition

U. S. Patent 2,605,193. Robert E. Karll, Hammond, Ind., assignor to Standard Oil Company, Chicago, Ill., a corporation of Indiana.

A bituminous composition of matter comprising an asphalt and about 0.5 percent to 5 percent by weight, based on the asphalt, of the reaction product of heating an unsaturated fatty acid having between ten and twenty carbon atoms per molecue with from 5 to 15 percent by weight, based on the fatty acid, of elemental sulfur for a sufficient time to effect reaction therebetween.

Non-Flocculating, Non-Striating Lacquer

U. S. Patent 2,602,756. Robert Tyler Hucks, South River, N. J., assignor to E. I. du Pont de Nemours & Company, Wilmington, Del., a corporation of Delaware.

A non-flocculating and non-striating lacquer comprising cellulose nitrate, a solvent therefor, a phthalocyanine pigment, and at least 0.2%, based on the total composition, of ethyl cellulose.

Ship Hull Anti-Fouling Paint

U. S. Patent 2,602,752. William J. Francis, Portsmouth, Va.

A toxic sag-resistant paint comprising rosin 36.67 to 41.67%, paraffin wax 4.44 to 8.00%, ceresine wax, 2.38 to 4.55%, copper linoleate 13.64 to 20.0%, cuprous oxide 32.46 to 37.87% and inert pigment 0 to 5.41%.

PROPERTIES OF PURE MATERIAL

Molecular Weight.....89.14
Melting Point, °C.....30 to 31
Boiling Point, °C....165 at 760mm
Specific Gravity..0.934 at 20/20°C
pH at 20°C of 0.1M Solution..11.3
Vapor Pressure
at 20°C .....approx. 1mm
Flash Point (Tag. open cup) .159°F
Solubility in Water g/100
ml at 20°C..completely miscible

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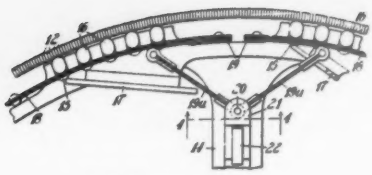

U. S. PATENT 2,604,270

Grinding Machine

U. S. Patent 2,604,270. John McIntyre, Portobello, Scotland Application May 3, 1949, Serial No. 91,164 In Great Britain May 10, 1948.

A machine of the type set forth having a rotor provided with open ended radial slots, grinding bars fitted in said slots so as to be capable of an outward radial movement therein and at least one resilient flexible band bearing on said bars and urging them outwardly in and with respect to their slots.

Organosilicon Oils

U. S. Patent 2,604,487. Charles A. Burkhard, Alplaus, N. Y., assignor to General Electric Company, a corporation of New York.

An organosilicon oil comprising the unit structure

$$[-(CH_2)_ySi(CH_3)_2(OSi(CH_3)_2)_n(CH_2)_ySCH_2CO_2(CH_2)_mO_2CCH_2S-]_x$$

wherein n is a number from 0 to 10, m is an integer equal to at least 2, y is one of the integers, 2,3, and x is an integer equal to at least 1.

Metallic Enamel

U. S. Patent 2,604,414. Ralph E. Pike, Media, Pa., assignor to E. I. du Pont de Nemours & Company, Wilmington, Del., a corporation of Delaware.

A coating composition adapted to yield a tough, durable finish having a metallic appearance of great depth and brilliance comprising a vehicle and pigment, the said pigment consisting of (A) prime pigment selected from material of the group consisting of colloidal hydrous iron oxide and chromium tetrahydroxide; (B) pigment substantially complementary in color to the said prime pigment in amount to yield a gray when mixed separately therewith; (C) at least one colored tinting pigment and (D) finely divided flake aluminum metal.

Wax Composition

U. S. Patent 2,598,666. Louis M. Sesso and Anna Mae Jordon, Racine, Wis., assignors to S. C. Johnson & Son, Inc. Racine, Wis.

An aqueous wax composition consisting essentially of from 3 to 14% by weight of a wax selected from the group consisting of ouricury, carnauba, beeswax, paraffin and mixtures thereof, from 3 to 30% of a material selected from the group consisting of monohydroxy aliphatic alcohols having from 1 to 4 carbon atoms, acetone, dioxane, ethylene glycol monoethyl ether, ethylene glycol monomethyl ether, ethylene glycol diethyl ether and mixtures thereof, an emulsifying agent and the major portion by weight of water.

Protecting Metals Against Corrosion

U. S. Patent 2,602,760. Josef M. Michel and Karl F. Hager, Fort Bliss, Tex., assignors to the United States of America as represented by the Secretary of the Army.

The process of protecting a metal surface against corrosion which comprises forming a film on said surface by applying thereto a water emulsion adjusted to a pH value numerically less than 7 containing at least 0.1% of a material selected from the group consisting of alkyl-sulfamido-carboxylic acids, inorganic salts of such acids and organic salts of such acids, the alkyl radical of said acids having at least five carbon atoms.

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abstracts

Cross-Linked Condensation Type Polymers

Walker, F. T. and Mackay, T., Michael Nairn Co., Scotland. Presented at the Elastomers and Plastomers Section XII, International Congress, Sept. 11, 1951.

In times of drying oil scarcity, polyester gels have been used as a partial or complete replacement for linoleum cement — the binder used in linoleum masses. Thus, the Germans have developed the Li 160 series based on adipic acid and trimethylolpropane, while the authors have produced on a commercial scale similar material from adipic acid-pentaerythritol and ethylene glycol. These materials bear a remarkable resemblance to linoleum cement in both the rheological properties of the uncured gel and the properties of the finished floor covering, the only weakness of the synthetic materials being an increased susceptibility towards hydrolysis.

In further research aimed at the production of a polycondensate of superior properties, the authors have tackled this problem from two angles (a) modification of the gel by the incorporation of drying oil and (b) modification of the basic ingredients of the gel by the introduction of other monomers likely to yield a more stable product.

Oil-modified polyester gels have superior resistance to hydrolysis, many different modifications were investigated and it was found that oils such as tung or oiticica were particularly effective. A useful material was obtained from maleinised tung oil, adipic acid, and pentaerythritol.

In the more fundamental approach, numerous dibasic acids were examined, and it was shown that acids of shorter chain length than adipic yielded unsuitable brittle gels. Increase in chain length, e.g., sebacic, gave gels having greater resistance to hydrolysis. The aromatic dibasic acid — terephthalic — also yielded gels of superior resistance.

When the ester linkages are replaced partially by amide linkages, e.g., by the use of a proportion of, say, hexamethylene diamine, considerable toughening of the gel occurs due to the more rigid nature of the amide grouping. A more rubbery product can, however, be obtained by the introduction of some disorientating agent such as propylene glycol. Methylation of an amide linkage has a similar effect.

The use of polyisocyanate to yield a urethane linkage has also been investigated. This reaction has the added advantage that no volatile scission products are evolved; but the rapid rate of reaction is a handicap as far as linoleum manufacture is concerned.

The introduction of a proportion of unsaturated material which can be cross-linked at will, using a peroxide catalyst is a well-established practice in the field of laminating and bonding resins; and this method yields some interesting results.

These researches are leading to the production of a polyester gel which can be modified as desired, and which would be superior in performance to the conventional drying oil linoleum cement.

Low Temperature Production Of Oxidized Oil Gels

Walker, F. T. and Mackay, T., Michael Nairn Co., Scotland. Presented at the Elastomers and Plastomers Section, XII International Congress, Sept. 11, 1951.

The Linoleum Industry has a high rate of consumption of oxidized drying oil produced at temperatures not higher

Chats about Finishes

ABITOL® HELPS PREPARE BETTER ALKYD VEHICLES

by

J. O. SMALL

Sales Supervisor, Hercules' Synthetics Department

Present-day requirements for the preparation of alkyd vehicles, such as those used in self-priming flat wall paint and similar finishes, posed a problem for manufacturers until Abitol entered the picture. In preparing such vehicles, alkyds must be held until they achieve the highest possible viscosity which can be obtained in a mineral spirits dispersion of dependable stability. Under ordinary conditions the margin of safety between this point and the point of gelation is far too small. By incorporating Abitol in such syntheses, the margin is widened to make possible the preparation of alkyd vehicles better suited to modern demands.

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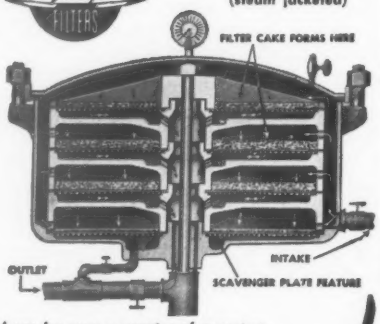

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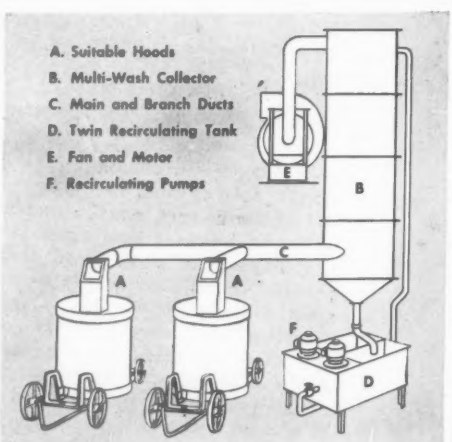

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than 85°C. The rate of oxidation is comparatively slow below this temperature.

Two main oxidation methods are employed (a) The Scrim Process, in which drying oil is repeatedly flooded and allowed to dry over large sheets of cotton scrim; (b) The Mechanical Process, where the earlier stages of oxidation are achieved by showering or blowing the oil in bulk, followed by mechanical stirring and blowing, which converts the oxidized oil to the gel state. This method has been largely modified by blowing and mechanical agitation of the oil during the whole process.

The oxidation rates for these two processes over a range of temperatures have been measured and it is shown that the oxidation rate is fastest when the oil is spread out as a thin film and offers the maximum possible air oil interface, as in the Scrim Process; but, although in the Mechanical Process the oxidation rate is slower, the batch of oil become immediately available.

A novel method (c) is described, in which the advantages of both the established processes have been utilized in producing oxidized oil up to the viscous oil stage, and a very appreciable increase in the rate of oxidation has been achieved. Since the method is continuous, considerable economy is effected with a more uniform end product. The reactor used in a packed column maintained at any desired temperature, drying oil (freed from antioxidants and containing driers) is fed in at the top of the column, whilst counter currentwise warm air is led in at the foot. In this manner, the oil is broken up into an enormous number of films, in which state it is oxidized rapidly and an appreciable yield of bodied oil is obtained from a column of quite small dimensions. Oxidation rates, closely approaching those obtained with static films, have been noted. The viscous oil requires further mechanical treatment to reach the gelled condition.

The results obtained are compared with other published data and discussed in the light of current theories on the mechanism of oil oxidation.

Nature of Adhesion of Lacquers To Non-Ferrous Metals

Brantley, L. Reed, Woodward, A. E., and Carpenter, Gordon, Occidental College, Los Angeles, Calif.

Presented at the Elastomers and Plastomers Section, XII International Congress, Sept. 11, 1951.

Many theories have been proposed for the nature of the adhesion of organic coatings to metals. In practice the mechanism of adhesion appears to be rather complex. Its study has been further handicapped by the lack of methods of measurement sufficiently independent of the other properties of

the film-substrate system to constitute a satisfactory determination of adhesion. The development of the ivory knife adherometer has provided a promising research tool for the investigation of the mechanism of adhesion, provided the limitations in the use of the instrument with certain types of coatings and substrates are observed.

This paper is the result of an investigation with the adherometer of several of the factors responsible for the adhesion of simple organic coatings, such as an unpigmented lacquer, to aluminum. The results of experiments showing the effect of the composition of the lacquer on its adhesion to 24ST aluminum, will be described. In the case of both nitrocellulose and ethylcellulose lacquers plasticized with dibutyl phthalate, an optimum plasticizer percentage was found. Experiments were designed to show the effect of the percentage of polar groups in the film former on its adhesion. It was found that for nitrocellulose lacquers differing only in the per cent nitration of the cellulose, the adhesion to aluminum increased with the per cent of nitration. No appreciable effect on the adhesion to aluminum was obtained for ethylcellulose lacquers differing only in per cent ethoxy content of the ethylcellulose. The effect of the degree of polymerization of the film former on its adhesion to aluminum was investigated. Nitrocellulose lacquers, differing from one another only in the degree of polymerization of the polymer, showed a maximum in adhesion in the intermediate range of polymerization. An investigation of the loss in adhesion of ethylcellulose lacquer coatings on a series of metals with different coefficients of expansion, during hot and cold cycling, showed that the resulting loss in adhesion was roughly proportional to the difference in the expansion coefficient of the lacquer coating and the metal used.

Liquid Polymers of Acrylic Esters

Rehberg, C. E. and J. Siciliano, Eastern Regional Research Laboratory, Philadelphia 18, Pa. Presented before Div. Paint, Varnish, and Plastics Chemistry, ACS, at Milwaukee, Mar. 30-April 3, 1952.

Liquid alkyl polyacrylates of low molecular weight were made by polymerizing the monomers in various isopropylbenzenes (1 to 2 by volume) in the presence of 0 to 20 mole % of dodecyl mercaptan. Preferred procedure included slow addition of monomer, with or without 1 mole % of di-*tert*-butyl peroxide, to refluxing triisopropylbenzene. Use of mercaptan markedly reduced molecular weights but resulted in polymers with objectionable odor. Up to about one half of the polymeric material could be distilled below 250° (0.01mm.) and distilled ethyl and butyl polyacrylates were fractionated to produce relatively homogeneous fractions. The undistillable liquid residues showed molecular weights in the range 1300 to 6400, as estimated by light scattering. Their viscosities ranged from 267 to over 40,000 cps., with ASTM viscosity slopes of 0.52 to 0.72.

Styrenated Epon Resin Esters

McNabb, J. W. and Payne, Henry F., Brooklyn Polytechnic Institute. Presented before Div. of Paint, Varnish, and Plastics Chemistry, ACS, at Milwaukee, Mar. 30-April 3, 1952.

Epon resins 1001 and 1004 were esterified with the fatty acids of dehydrated castor oil. The resulting esters were styrenated by the solvent method with either styrene or a mixture of styrene and alphamethylstyrene, depending on the viscosity of the ester and the ratio of combined styrene desired in the product. The rates of reaction for several ratios of styrene to ester are given. A comparison of benzoyl peroxide with di-tert-butyl peroxide as catalyst indicated the latter gave greater efficiency in the reaction and a paler color in the product. Clear, homogeneous products were obtained having combined styrene ranging from 15 to 46%. Preliminary evaluation of these products in surface coatings indicates improved resistance to water and alkali with no loss of the adhesion and flexibility characteristics of the Epon resin esters. These advantages are obtained at a lower cost under present price conditions.

Styrenated Esters of Bisphenol-Epichlorohydrin Condensates

Tess, R. H., Jakob, R. H., and Bradley T. F., Shell Development Co., Emeryville, Calif. Presented before Div. of Paint, Varnish, and Plastics Chemistry, ACS, at Milwaukee, Mar. 30-April 3, 1952.

Bisphenol-epichlorohydrin condensates were esterified by fatty acids and then combined successfully with styrene. Each styrenation was carried out by adding a mixture of styrene and di-*tert*-butyl peroxide to an Epon ester in xylene solution. Bisphenol-epichlorohydrin condensates of various molecular weights were used, but most extensive work was performed on a product of molecular weight 1400 (commercial Epon 1004 resin of the Shell Chemical Corp.).

The styrenated esters were obtained as homogeneous solutions yielding clear films when they were derived from linseed acids or a mixture of soya acids (80%) and dehydrated castor acids (20%). When straight soya acids were used to make the Epon esters, the derived styrenated products were not homogeneous. Preparative procedures were devised wherein essentially all of the styrene was combined, thereby eliminating any necessity for removing excess styrene and solvent.

Various factors which affected the rate of the reaction of styrene with the esters were investigated. The rate of reaction and ultimate conversion of styrene increased considerably with increase in concentration of styrene in the styrene-ester mixture and alsoby raising the temperature. It also was found that by addition of catalysts in increments, instead of all at once, the initial rate of disappearance of styrene was slower but its ultimate conversion was greater.

The products made by styrenation of Epon esters were characterized by very rapid drying rates. In this respect they were similar to styrenated alkyds, but the styrenated Epon esters were superior to styrenated alkyds in mar resistance, flexibility and alkali resistance. A styrenated soya-dehydrated castor ester of Epon containing about one-third styrene showed excellent durability when exposed as clear films on wood.

Anticorrosive Primers

Alexander, A. A., Fericks, R., Segrave, H. J. E., and Cowling, J. E., Naval Research Laboratory, Washington 25, D. C. Presented before Paint, Varnish, and Plastics Chemistry, ACS, at Milwaukee, Mar. 30-April 3, 1952.

The rapid deterioration of magnesium in marine environments due to corrosion has precluded its use for many possible structural parts, for example, in hulls of naval aircraft. Initial studies as reported here were directed toward the development of the optimum matrix for carrying inhibitive pigments for the protection of magnesium. Results appear to indicate that phenolic matrices offer appreciably greater protection in this respect than other vehicles. Care must be exercised in selecting compatible matrices for primer and top coats.

A wide variety of inhibitive pigments were studied by incorporation into the vehicle of the standard aircraft primer specification. Evaluation studies included salt spray, tide level, and acceleration exposures. In addition, the solubility characteristics in sea water were determined for a number of pigments and the corrosion rate of magnesium was measured in several inhibited sea water solutions. Since many of the recognized inhibitive pigments for the lighter alloys are relatively soluble, a study was made of the role of soluble salts as additives for normal pigmentations for the inhibition of corrosion of magnesium. Some correlation was found between the inhibitive action of soluble pigment in sea water and the same pigment incorporated into organic films. Differences in rate of corrosion of magnesium alloys of slightly variable metallurgical composition were noted.

TECHNICAL Bulletins

SPECIAL COATINGS

4-page bullentin describing a dozen different special coatings for plant maintenance use has been issued by United Laboratories, Inc. of Cleveland, Ohio. This new literature describes the use of various industrial products for solving such problems as skidproofing, rust prevention, painting over damp areas, weatherproofing and decoration of exterior masonry, interior waterproofing, painting over hot surfaces, protection against acids, chemical fumes and other special maintenance work. Numerous problems are listed in the folder followed by brief suggestions as to the solution.

SS NITROCELLULOSE

Revised edition of the technical booklet about SS Nitrocellulose, a specialty nitrocellulose, is available from Hercules Powder Company, Wilmington, Del.

To aid the formulator this revision includes twenty charts which illustrate studies in solubility of SS Nitrocellulose.

The charts are divided into four groups, by the use of color, to show the effect of viscosity of the material; the effect of ethanol; the effect of diluent; and the effect of type of alcohol used.

Also included in the booklet is new information about the use of SS Nitrocellulose in heat-seal lacquers; aniline inks; and as a shellac modifier.

CASTER & TRUCKS

Newly-revised 36-page Rapistan Caster and Truck Catalog covering an expanded line of equipment has just been published by The Rapids-Standard Company, Inc., 342 Rapistan Bldg., Grand Rapids, Michigan. This 2-color fully-indexed catalog has photos and complete specifications on casters and wheels designed to handle light, medium, or heavy loads on all types of floor surfaces.

PLASTICIZER

A new 24 page booklet discussing the complete line of Emery Plastolein Plasticizers has been released. In addition to specifications and properties for Plastolein 9050 DHZ (di-2-ethylbutyl azelate), 9508 DOZ (di-2-ethylhexyl azelate), 9055 DGP (diethylene glycol dipelargonate), 9250 THFO (tetrahydrofurfuryl oleate), 9715 Polymeric, and 9720 Polymeric, it contains considerable useful information on testing of plasticizers including ultra-violet stability and heat stability. Test methods and stabilizer data are also included.

This illustrated booklet is available on request from: Emery Industries, Inc., Dept. 5, Carew Tower, Cincinnati 2, Ohio.

SPECIFICATION GUIDE

Guide to specification lacquers for finishing military items enables supplier of finishes to find out what kind of lacquer finishes is being called for when all they have is a specification number. Specification numbers for finishing such items as

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vehicles, aircraft, ammunition, furniture, and containers are included. Hercules Powder Co., Wilmington, Del.

MODIFIED STYRENE

Booklet describes "Lustrex X-700" series of water-soluble, modified styrene polymer resins which have a variety of applications in oil, plastics, paper and paint. Monsanto Chemical Co., Plastics Div., Springfield, Mass.

FIRE RETARDANT PAINT

Reprint gives summary of fire retarding paints which are available together with formulations. Integral components of such paints, and what constitutes a good fire retarding paint are also presented. Chemit Co., 247 Belmont Ave., Brooklyn 7, N. Y.

CLAYS IN PAINT

Six page bulletin discusses the use of clay in paint. Physical and chemical properties together with chemical and screen analysis are included. Various advantages of clays in paint are also covered.

Of particular interest to the formulator is a discussion of the use of clay in eggshell or semi-gloss enamels and suggested formulation of latex paints employing clay as part of the pigment composition. Harwick Standard Chemical Co., 60 South Seiberling St., Akron 5, Ohio.

MIXERS

Line of mixers are discussed in 32-page booklet. Includes design, mechanical features, discussion on choosing impeller, charts and tables as aids in selecting correct mixer for a specific job. Mixing Equipment Co., Inc., Rochester 11, N.Y.

REMOVING CONTAMINANTS IN AIR, GAS SYSTEMS

Two revised bulletins pertaining to equipment for the removal of water, water-oil emulsions and dirt from compressed air and gas lines have just been released. The equipment operates without moving parts, using specially treated ceramic filter candles to clean the air or other gas without significant pressure drop. One series of the equipment covers the range of 10-to-75 cfm; the second series, from 100-to-500 cfm. Liquids are ejected continuously and automatically, the filter candles are readily removed for cleaning. "Selas Liqui-Jectors." Bulletins SC-1007-1008. Selas Corporation of America, Philadelphia 34, Pa.

SAFETY IN GAS SYSTEMS

Bulletin describes fully two protective devices used in the piping systems of gas-and-air combustion systems. The automatic fire check is used to detect, localize and extinguish a flashback in the gas-air mixture lines, close to the gas burners. The safety blowout is used to prevent damaging flashbacks in the main supply piping from damaging combustion control quipment and to relieve excessive flashback pressures by diverting the shock forces safely. "Selas Automatic Fire Checks and Safety Blowouts — Combustion Safeguards." Bulletin SC-1006. Twelve pages. Selas Corporation of America, Philadelphia 34, Pa.

COLORS FOR LATEX EMULSION PAINTS

Entitled "Important Notes on Colors for Latex Emulsion Paints", this 8-page booklet discusses some important factors regarding the selection of color pigments for use in latex paints, recommended pigments produced by the company, and advantages of such pigments. Ansbacher-Siegle Corp., Rosebank, Staten Island 5, N. Y.

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Catalog gives full information on line of mechanical drive "U" Type metering and proportioning pumps. Full specifications and prices are included plus a section on selection of "U" Type Pumps. The selection data makes it possible to specify the exact pump for any of over 300 listed substances that are successfully being handled with "U" Type pumps. Copies of the catalog may be obtained from Hills-Mccanna Co., 2468 W. Nelson St., Chicago 18, Illinois.

SCREEN BURNERS

This new bulletin describes a special design of a tunnel type multiport gas burner that can be used in either furnace or open-firing applications. These burners are designated to operate with pressurized mixtures of any fuel gas and air. The design provides for operation on either low or high gas-air mixture pressures. Burners of this design deliver from 2,000 to 6,000 Btu per hour. "Selas Refrak Screen Burners." Bulletin SC-1009. Eight pages. Selas Corporation of America, Philadelphia 34, Pa.

PENT-ACETATE

"Pent-Acetate in Lacquer", a 20-page booklet describes the use of Pent-Acetate, synthetic Amyl Acetate, in lacquer. The booklet discusses: solvent power of Pent-Acetate for systems containing resins and RS nitrocellulose; solvent release from lacquer films containing Pent-Acetate; use of the product as a retarder; film flow; evaporation rates; and blush resistance.

Comparison of the action of Pent-Acetate with similar materials is illustrated in ten graphs. Booklet is available from Sharples Chemicals, Inc., 123 South Broad St., Philadelphia 9, Pa.

BUTYL ALCOHOL

n-Butyl Alcohol is described in a new technical bulletin prepared by Carbide and Carbon Chemicals Company, a division of Union Carbide and Carbon Corporation. Chemical, physical, and physiological properties; solubility and shipping data; and applications are included.

Chemicals for making synthetic resins, plastics, plasticizers, rubber accelerators, dyestuffs, week killers, pharmaceuticals, and flavorings, and coatings for leather, paper, and textiles are prepared from n-Butyl Alcohol.

n-Butyl Alcohol is a diluent in hydraulic fluids and is used as an extractant in the manufacture of antibiotics, vitamins, hormones, and flavorings.

The technical information bulletin (F-7909) is available from Carbide and Carbon Chemicals Company, 30 East 42nd Street, New York, 17, New York.

PICKLING INHIBITOR

Chart lists the principal types of Rhodine (pickling acid inhibitor) and describes their most important characteristics. American Chemical Paint Co., Ambler, Pa.

TRIBUTYL PHOSPHATE

Data sheet contains general characteristics and uses of tributyl phosphate. Toxicity and handling are also included. Commercial Solvents Corp., 260 Madison Ave., New York 16, N. Y.

PENTAERYTHRITOL

Properties and uses of pentaerythritol are covered in a technical data sheet issued by the Commercial Solvents Corp., 260 Madison Ave., New York 16, N. Y.

ETHYLHEXANOL

Bulletin F-7908 lists physical and chemical properties and shipping

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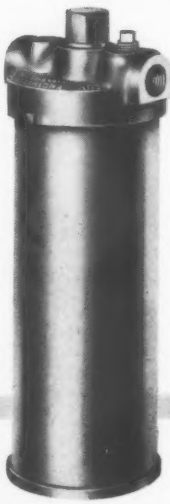

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data of 2-ethylhexanol. This chemical finds application in surface coatings, textiles, leather dressings, rubber, asphalt and disinfectants. It is used as a solvent; a defoaming, dispersing, and wetting agent; and as a chemical intermediate. Carbide and Carbon Chemicals Co., 30 E. 42nd St., New York 17, N. Y.

SILICONE RUBBER

24-page bulletin includes comprehensive information on properties, applications, classes, and design specifications of G-E silicone rubber. General Electric Co., Chemical Div., Pittsfield, Mass.

SILICONE FLUID

Properties and uses of Dow Corning 200 Fluid are covered in 32-page booklet. Of interest to paint and varnish manufacturers is the use of this fluid as an additive to prevent floating. Dow Corning Corp., Midland, Mich.

VINYL PLASTICIZER

Properties and uses of di-(2-ethylhexyl) adipate as a primary plasticizer for vinyl resins are described in a technical service report. It is used in such vinyl applications as film, sheet, extrusion, dip coatings and slush molded products. This plasticizer blends easily and rapidly with vinyl chloride resins and is useful in formulating vinyl plastics by the dispersion technique. For copies of Report E-3, write to Witco Chemical Co., 295 Madison Ave., New York 17, N. Y.

CARBON BLACK

Brochure describes concentrated carbon black dispersions in a variety of plasticizers and solid resins. Technical data and formulations of the product are covered together with suggested application of each dispersion. Peerless Printing Ink Co., Ontario and Janney Streets, Philadelphia 34, Pa.

ORGANIC CHEMICALS

Eight-page booklet list line of organic chemicals under the following heads: solvents, industrial chemicals, and resin and plastics. General characteristics, uses and specifications of each chemical are discussed. Shell Chemical Corp., 500 Fifth Ave., New York 18, N. Y.

Trigg Foundation Announces First Project

The Ernest T. Trigg Foundation has announced that the first project of the organization will shortly get under way. The foundation's executive committee has approved an appropriation for three scholarships in an intensive paint course at the North Dakota Agricultural College.

Ell-Bee Chemical Formed

Ell-Bee Chemical Company a new producer of industrial finishes and thinners has been formed in Hanover, N. J. Everett A. Tyler is president of the concern, while Raymond J. Feehan is secretary.

ACS Paint and Varnish Division Approves Plan For Name Change

The members of the Paint, Varnish, and Plastics Chemistry Division of the American Chemical Society have approved a change in the divisions name. The change will be passed on by the ACS council at the Society's meeting in Atlantic City, N.J., September 14 to 19. If the change is sanctioned, the division will be known as the Division of Paint, Plastics, and Printing Ink Chemistry.

The division has scheduled three symposia for the fall meeting. They will cover: *Adhesives*, with C.F. Brown as chairman; *Emulsion paints and emulsion polymers*, J.K. Wise, chairman; and *Resins in textile finishing*, J. McE. Sanderson, Chairman.

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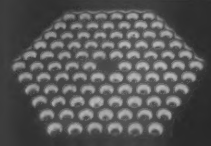

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New Lab for Mearl Corp.

The Mearl Corporation, New York City, has put up a new 2-story laboratory building, 50x150-ft. at Peekskill, N. Y. The top story is occupied by individual laboratories, each laboratory being capable of supporting two chemists and an assistant. Provisions are being made for 24 chemists to work on the upper floor.

The lower part of the two-story building will be divided up into what is known as technical development laboratories and will have many facilities, both for compounding and using pearl essence in different industrial fields. One room, for example, will have a spraying department and special coating applicators, such as roller coating, etc. The whole layout will be such that the company can put into practical development use, any information it picks up in the laboratories upstairs.

The back part of the building will be used for pilot plant development of the various nacreous pigments. In addition to its natural pearl essence, and its Nacromer, the company also manufactures three other nacreous pigments which are used at present only in the plastics industry, but the firm expects to introduce them into the coating industry.

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College-Industry Material Handling Committee Formed

In order to make it possible for engineering students better to equip themselves for fruitful industrial service in the fast-growing technology of material handling, the 78 major manufacturers of material handling equipment (acting through their trade association, The Material Handling Institute) and the nation's 3,000 professional material handling engineers who are members of the American Material Handling Society have joined hands with leaders in the field of engineering education to form an autonomous College-Industry Committee on Material Handling Education.

The committee's work will be dedicated to five clear cut objectives:

1. To make available to colleges and other study groups material of recognized quality for use in courses on material handling.
2. To initiate development of new material, not presently available, for use in such courses.
3. To become known as a source and authority on sound good-quality information for material handling courses.
4. To stimulate more teaching of material handling (and the importance of material handling) in the nation's colleges and universities.
5. To determine from industry what skills and understanding it requires in the material handling engineers the colleges turn out.

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Morehouse Representatives In Mexico and Latin America.

Glenn H. Morehouse, partner in Morehouse Industries, Los Angeles, manufacturers of specialized processing mills, and Norman W.F. Klein, foreign sales manager, are travelling through Mexico and Latin America meeting with foreign sales representatives to discuss technical developments, sales promotion and the application of Morehouse equipment to local industrial needs.

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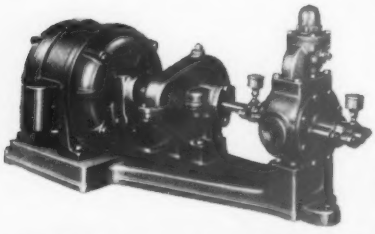
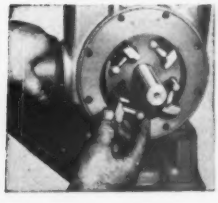


2 VANE TYPES



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DEVELOPMENT AND—

(*From page 31*)

designed for one type product.

Accordingly, high-bake industrial white metal finishes require quite different equipment from that used to make exterior house paints and in the most specific cases the two production set-ups are not interchangeable.

Two main trends are evident today in equipment design — (1) Specific design encompasses — the design of plant facilities and grinding equipment specifically for one type of pigmented surface coating. This operates on the basis of high volume per unit, long product life. Production time is low, material losses high, control easy, but adaptability of assembly to other lines of production very limited. Stand-by and emergency operations require detail planning. (2) Non-specific design considers — designing for production of a wide variety of items. Operating on the basis of good adaptability to many kinds of paint production. Volume per unit of equipment cost does not approach that of specific design. Product life is not important since a variety of alternate materials can be produced. Production time is uncertain — material losses originate from non-specific materials handling equipment and personnel not familiar with various set up. Supervision requirements are greatly increased. Control becomes an increasing requirement.

Non-specific equipment can operate effectively based on a number of standard medium size units so that standby equipment is not so serious a problem.

Where does production development fit into this picture?

Many companies consider that with adequate process and design development a non-specific design set-up can closely approach specific design and retain the advantage of flexibility.

Steps in this direction are (1) instrumentation development, (2) installation of newer type grinding and dispersion equipment and (3) detailed paint processing study aimed at adjustment to equipment.

Instrumentation has become a prime consideration in the design of a chemical processing plant. Instrumentation has been generally neglected to date in the design of paint processing plants. But the advantages of adequately instrumentalized control appear in rapid control reporting, central information is available promptly on diverse items and supervision time is decreased. As a result of experience in instrumentalized plants prediction of lab-to-plant results becomes more certain, and duplication of facility is avoided.

Measuring Process Development

PROGRESS measurements are essential. An apparent record of progress would be a report of changes in the volume of material produced and sold by a company. This "volume production report" is definitely misleading when viewed alone. For example, when the volume production of a given company increases by six percent over a given year, while over the same period the total production of the industry increases by nine percent, then the company has actually undergone a contraction in activity.

A "where do we stand" report should indicate this second factor — the rate of expansion versus the industry rate of expansion — or more briefly called "company versus industry expansion rate". The "company versus industry expansion rate "includes the activities of a paint production group as one of its components. The question arises — how can a Paint Production Development Group gauge the results of its own specific group activity when those results are apt to be intangible.

Two technics can be used to accomplish this. One is the maintenance of a running record of laboratory-to-production lead-time. Once Laboratory Development and Sales have agreed on a formula, how long will it be before the finished product comes out of production, and comes out according to duplicatable specification? This time factor represents an evaluation of effective organization of the components in a "development machine". Decreasing "Lead-time" indicates improvement in development efficiency. A second measure of the results of Production Development lies in "Percent of Capacity Utilized". Low utilization indicates that cooperating groups have not been made fully aware of potentialities. Explanation of variances from orderly forward progression provide points for concentrated attack.

A still further gauge of Paint Production Development lies in the establishment of new goals. If as fast as one set of objectives appear within range of accomplishment, new goals and new problems are apparent, then operations are proceeding smoothly. As in the concept of any development, the report is not the end of a job done, but the beginning of more to be done.

Paint Production Development looks to getting keys to unlock two doors — the door leading to *what to do* and the door leading to *why it happens*.

In the practical perspective, Research and Development Technics are not the only methods of solving problems or of taking forward steps — some problems, with time, solve themselves — some respond to arbitrary decision. But all in the coating materials industry are becoming increasingly aware of the potentialities of the new tools of Research and Development in effecting production improvement

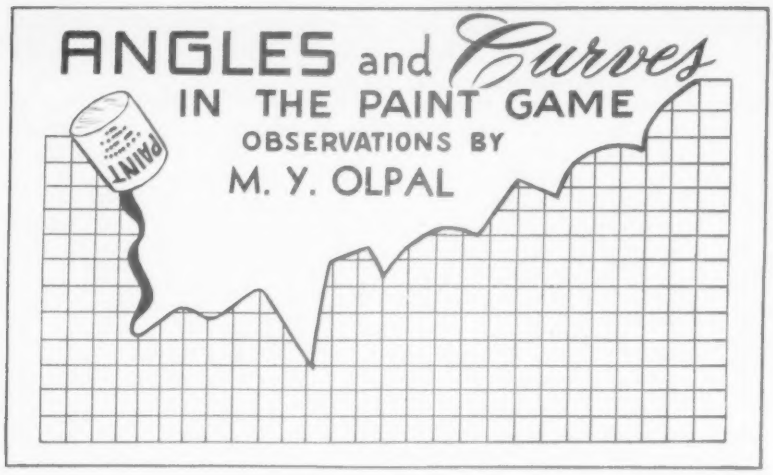
•

Reichhold Announces Plans To Expand Phenolic Output

At a recent press conference, Reichhold Chemicals, Inc., announced plans to manufacture and market powdered phenolics for a wide variety of industrial applications, including molding compounds, foundry shell molds and cores, brake linings, grinding wheels and wood waste products.

As a result of completion of expanded facilities at its Tuscaloosa, Ala., plant Reichhold will produce annually 60,000,000 pounds of phenol according to P. J. Ryan, vice president in charge of RCI's Southern Division. Completion of installation of new 10,000 gallon stainless steel kettles at RCI's Detroit and Elizabeth, N. J. plants as well as Tuscaloosa, also make it possible to produce vastly increased amounts of phenolic resins at these locations.

With 19 plants in foreign countries and ten in the United States, Reichhold Chemicals also plans to develop the use of powdered phenolics overseas as well as in this country.



"Oh, darn it!" Janie exclaimed.

I looked up quickly. "What's the matter?"

"I've got a run in my stocking," Jane complained.

My eyebrows shot up as the shapely leg poked around the desk. Janie had evidently forgotten I was in the room. She had pulled her skirt up high. But the view was cut off shortly as she leaned over to daub some fingernail lacquer on the run.

"With a leg like that, I don't see why you bother about stockings anyway."

Jane sat up startled. "Oh, you—!" She snapped as she whipped down her dress and twirled around in her chair. "For your information, I have a heavy date right after work."

"Oh? That explains the all-dressed-up look," I said with that wolfish gleam in my eyes.

"Humph," Jane snorted. "Can't blame a girl for wanting to look decent, can you?"

I shook my head. "Of course not. But that reminds me. Remember the other day when we were talking about men being a necessary evil for you and paint products being a necessary evil for us?"

As she looked up, my mind flashed back to the day when I caught her silhouetted against the window trying to pull down the venetian blind.

"Well?" Jane demanded impatiently.

"Oh? What was I talking about?" I asked snapping out of my daydream.

"About a product being a necessary evil."

"Oh, yes." I leaned back in my chair and brushed some ashes from my new handpainted tie. "Well, your stocking is just like another tool we use in the paint trade."

"My stocking?" Jane exclaimed in surprise.

"Sure. It's window dressing, come-on, or just plain advertising."

"My stocking is advertising? You must be getting soft in the head, Olpal!" Jane snorted.

I grinned slyly. "Why sure. Look at it this way, Janie. A diamond in the rough isn't any good to anybody. First it has to be found. Then it's a product. But a rough uncut diamond is only of interest to a few professionals. Once it is cleaned, polished, cut and put on display it commands a much better price and wider attention. That's just what you do when you get all dressed up for a date. And your stockings are part of your plan to command wider attention—whether you admit it or not."

Janie's eyes flashed. "You make me sound like a gold digger."

I shook my head. "I didn't mean to. You're just a smart business woman in your own field. You do the same thing we do with paints. We put on bright jackets to command attention. We run display ads in the magazines to get people to want to dress up their house. Why? So we can sell paint. Why? So we can make money."

"Humph!" Jane snorted as she turned her back to me. After a few minutes she turned again slowly.

"Tell me, Mr. Olpal," she started slowly. "Do you think I could deduct my stockings on my income tax as a necessary business expense?"

I laughed at that one. In fact I laughed so hard I almost fell out of my chair. After I recovered my composure, I shook my head. "I'm afraid not, my dear. I think that the government would say that it was a capital investment."

"Oh, you—!" Janie snapped as she stalked out of the office.

I just chuckled to myself.

CLASSIFIED ADVERTISEMENTS

Rates: $.20 per word, except those seeking employment, for which rate is $.10 per word. Minimum: ten words. Address all replies to Box Number, c/o Paint and Varnish Production, 855 Avenue of the Americas, New York 1, New York.

PAINT CHEMIST WANTED — man with at least two years experience in the formulation of trade sales finishes. Excellent opportunity with Raw Material Sales Service Laboratory in New York Metropolitan area. Advise salary desired in reply. All answers will be kept in strictest confidence. Box 142

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WANTED TO BUY — Interested in buying a going paint or chemical processing business. Cash or terms as seller may prefer. All replies confidential. Box 143

COLOR MATCHER — Textile finishing plant in Mid-west has position for experienced Color-matcher in pyroxylyn vinyl coating division. State past experience and personal data and salary desired. Box 144

FOR SALE — McDaniel Porcelain grinding balls in sizes 1½" to 3". Immediate shipment in 100 lb. bags at fraction of new price. General Traders, Inc., 2675 W. Grand Ave., Chicago, Ill.

F. H. Lane, Hercules Powder Coating Consultant Dies

Frederick Hall Lane, 69, well-known paint and varnish expert and industrial consultant, died recently in Sarasota, Florida.

For the past 28 years, Mr. Lane served as consultant on protective coatings for Hercules Powder Company, Wilmington, Delaware. He also was a consultant for Harbor Plywood Corporation, Hoquiam, Washington, and was director of chemical research for the Florida Research Corporation.

A native of Brooklyn, N. Y., Mr. Lane graduated from Brooklyn Polytechnic Institute in 1904, with a B.S. degree in chemistry. He taught for a year following graduation, then joined the U. S. Navy Department as a chemist at the Brooklyn Navy Yard. He entered the paint and varnish field in 1908 as chief chemist for E. Calman & Company. In 1923, he became research director for DeVoe & Raynolds. He joined Baer Brothers, Stamford, Conn., in 1925, as works manager, a post he held until 1929, when he retired from active manufacturing to engage only in consultant work.

Mr. Lane began serving as a consultant during World War I, when he advised the government concerning protective coatings for aircraft and ships. In 1924, he first aided Hercules Powder Company in its development of pale wood rosins and other naval stores. Later, he toured the country with Hercules representatives, demonstrating wood rosin and answering technical questions regarding its use. In the late 1920's, he directed much of the laboratory work at the Hercules Experiment Station on the development of Vinsol resin.

While his special interests centered around materials for paint and varnish. Mr. Lane also engaged in general consultant work with Hercules. He worked for a time with the Advertising Department, preparing literature for technical booklets and advertisements. In 1949, he retired as consultant for Hercules.

•

Barrett Opens Applications Laboratory at Edgewater, N.J.

A new laboratory, specially designed to develop and test materials and processes used in the manufacture of plastics, rubber products, paints and varnishes, and other products has been opened in Edgewater, N.J. by Barrett Division, Allied Chemical & Dye Corporation.

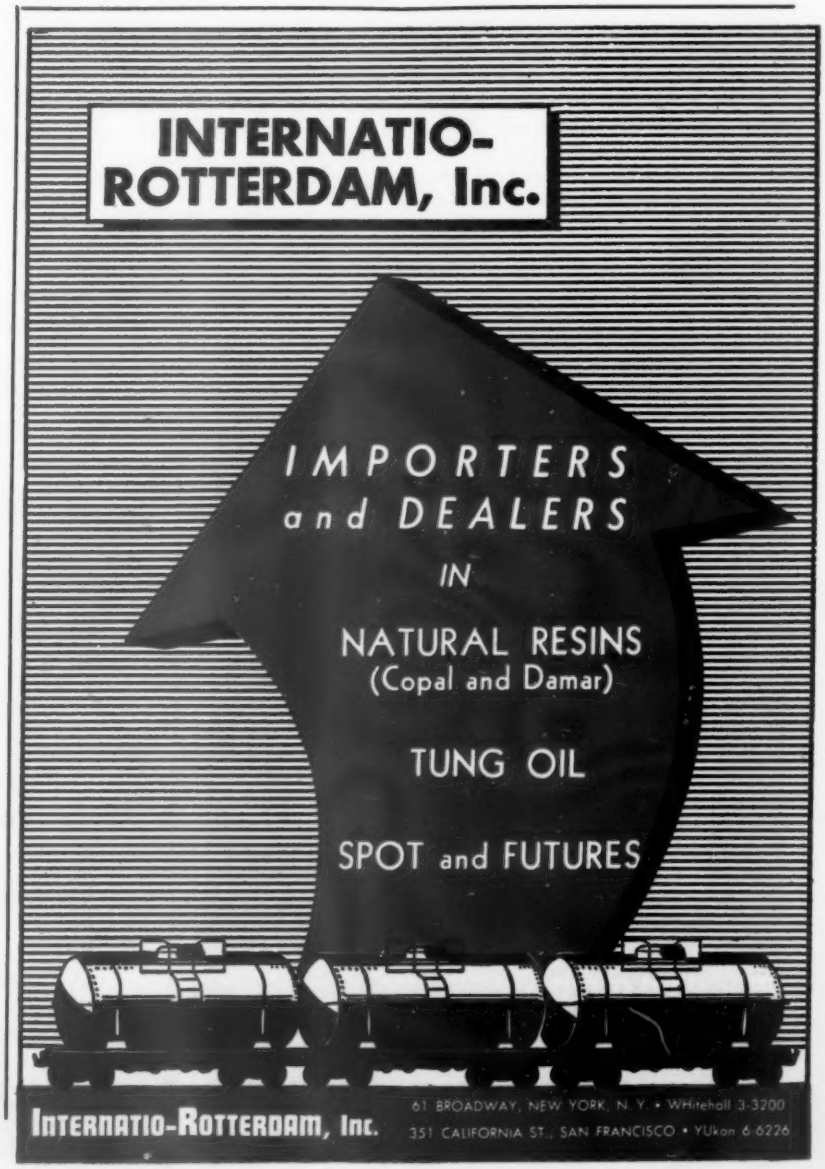
The laboratory will be known as the Shadyside Applications Research Laboratory, and will be in charge of D. A. Rankin, Superintendent. Containing extensive testing and actual production equipment, including mills, presses, calenders, extruders, molding machines and other special purpose facilities, the laboratory will enable Barrett technicians to develop, test and evaluate, under simulated production conditions, Barrett materials.

•

Packaging & Handling Show To Be Held in Chicago, Oct. 14-16

The importance to top management of scientific protective packaging and materials handling as profit-making functions will be emphasized at the seventh annual Industrial Packaging and Materials Handling Exposition in Chicago's famous Coliseum next Oct. 14, 15, and 16.

"Making Profits through Packaging and Materials Handling" will be the theme of the exposition. It will be dramatized in the unique annual Protective Packaging and Materials Handling Competition, whose prize ribbons are much coveted by professional packaging and materials handling engineers. It also will underlie the curriculum for the now famous annual "short course in packaging and materials handling," which will be conducted Oct. 13, 14, 15, and 16 under the sponsorship of the College of Engineering, Department of Mechanical Engineering, University of Illinois-Extension Division, at its "campus" at the Coliseum.



ALL-PURPOSE VALVE

(From page 34)

cal's Law", which states that "pressure applied to a confined fluid is transmitted uniformly to all areas of the confining surface". Thus, lubricant pressure developed by the lubricant screw exerts a powerful "jacking" action against the smaller end of the valve plug, at the same time forcing lubricant from the grooves into the area of contact between body and plug.

The tapered form of plug and seat provides an intimate fit, regardless of the thickness of lubricant film. Even with a complete absence of lubricant, the plug and body have a ground-joint, metal-to-metal contact.

When lubrication is neglected, there is always the possibility that paint or some other material will get into lubricant grooves and prevent the lubricant from following the correct channels to the base of the plug, which is necessary for the jacking action. For that reason, a maintenance program in which the valves are checked periodically, will lower the overall maintenance cost and improve the operating conditions in any plant. As the Stewart-Mowry Paint Manufacturing Co. found, the over-all life of the valve was increased ten times, which means that the maintenance cost over a period of years will be negligible.

The use of the name lubricant for this valve is really a misnomer as the so-called "lubricant" is actually a sealing medium as well as a "jacking" medium. There are a number of different types of lubricants as they must be resistant to the line fluid and the variety of line fluids encountered in the chemical and process industries includes gases, hydrocarbons, acids and alkalies. In the case of a paint or varnish plant, a few lubricants can take care of all the services as most of the chemicals used are very similar.

Maintenance Program

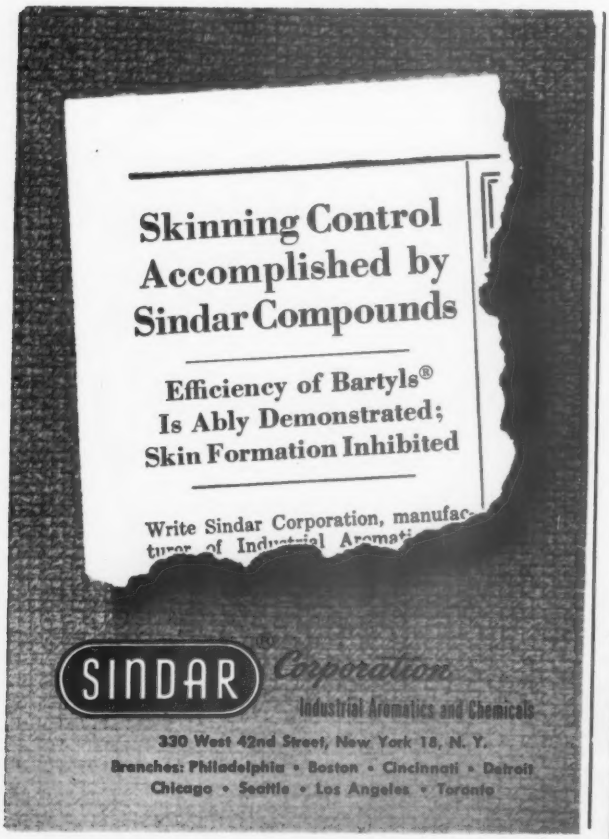
To insure trouble free operation of Nordstrom Valves it is important to have a regular valve lubrication schedule. Lubricants are available in stick or bulk form. The bulk lubricant is for use with a grease gun. For a plant having a large number of valves, the valves can be equipped with giant button head fittings and a grease gun used to save time.

The *Nordstrom Maintenance and Repair Bulletin* gives complete details as to lubrication and method of repair of these valves. Also a staff of service engineers is available for instructing the interested personnel at their own plant concerning proper maintenance.

•

Lutz of Pratt & Lambert Elected to ASTM Board

William H. Lutz, a member of the Federation of Paint and Varnish Production Clubs, has been elected to the Board of Directors of the American Society for Testing Materials for a three-year term. Mr. Lutz is a Past-President of the Western New York Club and has been active in Federation affairs for many years, currently serving on the 1953 Joseph J. Mattiello Lecture Committee. He is employed as Technical Director of Pratt & Lambert, Inc., in Buffalo, New York.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PORCELAIN ENAMELS

(*From page 36*)

Other uses include coatings on elevator buckets, for coal and chemicals, idler rollers for various types of conveyors, pipes and valves, heat exchangers, guides for fabrics, muffler and exhaust systems, and many others.

Newer Metals

In sharp contrast to organic finishes which can be applied readily to practically all common metals in an unlimited range of color and gloss, the very limited number of metals which could be satisfactorily porcelain enamelized, until recently, severely restricted the usage of these coatings. While a small amount of porcelain enameling was tried on some non-ferrous metals, such as copper and aluminum, most porcelainizing was traditionally confined to iron and steel.

The enamel quality of the base metal is probably as important to successful porcelain enameling as is the enamel itself. There, careful consideration has always been given to its selection. Because of the exacting requirements of porcelain enameling stock, iron and steel sheet products have been especially developed for it. Steel producers have searched constantly for means to improve the enameling quality of their stock.

A revolutionary advance within the past few years which has encroached upon organic coatings has been the development of new enamels and methods enabling one to successfully apply porcelain to aluminum on a small but growing commercial basis. The frits for these enamels are lead-bearing and have a relatively high alkalinity. Since the melting point of aluminum is near 1200° F, they are formulated to permit firing temperatures of about 1000°F.

Porcelain enamels for aluminum have good resistance to weathering, impact and thermal shock. They can be flexed, bent or formed to a limited extent after firing, and can be cut with a hacksaw. Since porcelain enamels for aluminum are still quite new, all their possible applications have not as yet been explored. Nevertheless, there is no doubt that they will cut into the market for organic finishes. Already store-front and other architectural applications have been found for them as well as advertising display signs and letters. Sanitary ware and accessories, washing machine tubs and agitators, outdoor furniture and other uses have been claimed for these porcelain enamels.

Among the more interesting developments are formulations that will withstand temperatures up to as high as 2600° F for short periods. These ceramic coatings are one means of meeting the high temperature service demands of parts in jet-propelled aircraft rockets, gas turbines etc.

Intensive research conducted by the porcelain enamel industry, particularly in the development of low-temperature frits, is gradually narrowing the breach between paint and porcelain. The combination of frits that can be fired between 600° and 800° F with improved ground coats will soon permit the use of a much greater variety of metals, including those of lighter weight.

Instead of ignoring these ceramic advances or attempting to compete with mere improvements on the old organic coatings, paint laboratories are advised to study the possibilities of incorporating low temperature frits into suitable organic vehicles. Such a partnership might well result in an unusual family of finishes.

•

Oil Chemists to Meet In Cincinnati Oct. 20-22

The American Oil Chemists fall meeting will be held in Cincinnati at the Netherlands-Plaza, Oct. 20-22. R. S. Stillman of Proctor and Gamble is program chairman.

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Technical Service Data Sheet
Subject: PROTECTING ALUMINUM WITH ALODINE®

"ALODINE" No. 100

"Alodine" No. 100 forms an amorphous phosphate surface on aluminum which is thin, tough, durable, non-metallic, continuous with and a part of the basis metal. The "Alodine" film anchors paint, prolongs paint life, and protects aluminum exposed unpainted to the atmosphere.

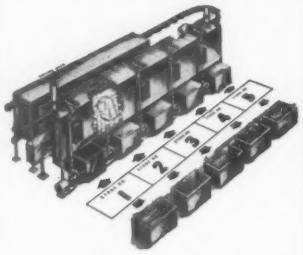
With the "Alodine" No. 100 bath at its normal temperature of 120° F., coating time by immersion approximates 1½ minutes—and by spraying, 15 to 20 seconds. Coating times and bath temperatures can be varied to suit operating conditions.

"ALODINE" No. 600

"Alodine" No. 600 forms corrosion-resistant coatings that provide excellent protection for unpainted aluminum and also make an effective paint-base. This grade is recommended for use in place of "Alodine" No. 100 on aluminum parts that are to remain unpainted or to be only partly painted; and on *all* aluminum castings and forgings whether or not these are given a paint finish.

"ALODINE" FLOW SHEETS

MULTI-STAGE POWER WASHER FOR SPRAY ALODIZING



IMMERSION TANKS FOR DIP ALODIZING

PROCESS SEQUENCE

1. Clean 2. Rinse 3. "Alodine" 4. Rinse 5. Final Rinse

NOTE: Equipment can be of mild steel throughout, except the "Alodine" stage which must be of acid-resistant material.

"Alodine" No. 600 is applied at room temperature (70° to 120° F.). Recommended coating times are 3 to 5 minutes for an immersion process and 1 to 1½ minutes for a spray process.

COATING DATA	"ALODINE" NO. 100	"ALODINE" NO. 600
COMPOSITION	Amorphous phosphate.	Amorphous mixture of metal oxides and chromates.
COLOR	Depending on alloy treated, color range is from an iridescent blue-green to a dark slate gray.	Depending on time of treatment, color range is from golden iridescent to light brown.
THICKNESS	From 0.01 to 0.08 mil. No appreciable dimensional changes occur when aluminum is Alodized.	From 0.005 to 0.01 mil. No appreciable dimensional changes occur when aluminum is Alodized.
WEIGHT	50 to 300 mgs. per square foot. Optimum: 100 to 200 mgs. per square foot.	35 to 50 mgs. per square foot.
SOLUBILITY	Insoluble in water, alcohol, solvents, etc. Insoluble in most dilute acids and alkalis. However, strong acids and alkalis which attack aluminum may penetrate the "Alodine" film and react with the underlying metal. Slightly soluble in concentrated nitric acid. Soluble in molten sodium nitrate, etc.	Insoluble in alcohol, water, solvents, etc. Soluble in strong alkalis and acids.
ELECTRICAL PROPERTIES	High dielectrical resistance.	This coating is electrically conductive. Aluminum coated with "Alodine" No. 600 can be shielded-arc welded or spot welded.
HEAT STABILITY	Unimpaired at temperatures that melt aluminum.	Unimpaired at temperatures that melt aluminum
FLEXIBILITY	Integral with and as flexible as the aluminum itself. Can withstand moderate draws.	Integral with and as flexible as the aluminum itself. Can withstand moderate draws.
ABRASION RESISTANCE	Approximately 90% of that provided by chromic acid anodized aluminum.	Approximately 90% of that provided by chromic acid anodized aluminum.
CORROSION RESISTANCE	Painted—superior to chromic acid anodizing. Unpainted—comparable with chromic acid anodizing. Meets MIL-C-5541 and other Government Finish Specifications.	Exceeds requirements of MIL-C-5541 and even AN-QQ-A-696a (anodic films)
PAINT-BONDING	Excellent. Equal to or superior to anodizing. Meets MIL-C-5541 and other Government Finish Specifications.	Excellent. Meets MIL-C-5541 and other Government Finish Specifications.
TOXICITY	Non-toxic.	Non-toxic.
BIMETALLIC CORROSION RESISTANCE	Shows good resistance against bimetallic or galvanic corrosion.	Shows good resistance against bimetallic or galvanic corrosion.

CHEMICALS ACP PROCESSES

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